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**CLASH BY NIGHT**

By LAWRENCE O'DONNELL

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# ASTOUNDING
## SCIENCE-FICTION

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*Contents for March, 1943, Vol. XXXI, No. 1*

*John W. Campbell, Jr., Editor, Catherine Tarrant, Asst. Editor*

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# MUTUALLY EXCLUSIVE

The classic example of the mutually exclusive sets of conditions is, of course, "You can't eat your cake and have it, too." There's another set of mutual exclusives that science-fiction has not recognized as such—has, in fact, joyously stirred together in an incompatible mixture time and again. The two are tied together in a favorite descriptive phrase about an immense city of the future, with sky-towering buildings laced through with planes and airships floating through the sky without visible support.

The two are mutually exclusive, as thoroughly so as the above-cited classic exclusives.

There are three general types of nonsurface transports imaginable: the airship, which floats in the air by the good, old-fashioned principle of displacing a weight of air equal to its own weight. Then there is a host of variations on the principle of active support by jets, wings or the modified jet principle of the propeller—which is a special type of pump designed to produce a jet. To this type could be added the imagined, but not yet produced, repulsor-beam support, a sort of cross between a true surface-transport car—simply walking on immaterial stilts instead of wheels—and a true air transport. The third general class would be the antigravity machine; a heavier-than-air ship that, by annulling the attraction of gravity actually becomes a lighter-than-air ship.

None of these types, nor any modification of them, permits the existence of a great city whose air is thick with their numbers. None of them ever can be an important urban transportation method paralleling the automobile.

The lighter-than-air type is too clumsy and too fragile for use in great numbers in the congested air of a city. We've had that type available for over a century, and nobody yet has tried to use them in urban transport. If they are capable of carrying a really useful load, they displace so inordinate a volume of air as to be unmaneuverable in city congestion.

The various active-support types fail for another reason. The present type of airplane fails for the very obvious reason that the dang thing is too impatient; it can't stand still an instant. A traffic jam of present-type planes is instantly converted into a few score tons of scrap metal and dead bodies.

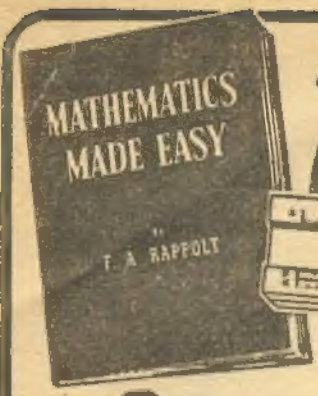
Sikorsky has invented a fully practical, genuinely workable type of helicopter. It can hang still in the air, rise vertically, move in any direction whatever, or any combination of directions. It can rise and lower itself at speeds as low as one foot a minute. The helicopter could settle easily onto a city building's roof, park between two—or in the midst of four or eight already parked—machines. It has the ability to wait that an automobile has. It certainly appears to be capable of creating the vast urban air traffic of fiction.

It can't. The propeller—and the helicopter hangs on a giant vertical-lift propeller—is a mechanical device for creating a jet of air; it derives its pull from the reaction of that jet. The propeller wash of a plane is a familiar thing today; the prop-wash of a helicopter's lifting blades will be, soon after the war. Remember that that helicopter's prop-wash is going to represent the reaction of the whole weight of the machine. It will be a huge jet of air on which more than a ton of steel and aluminum alloys is floating. That prop-wash is going to be an item to reckon with—and the prop-wash from ten or a dozen such ships waiting at an air-traffic light would be enough to make the air lanes for five or six hundred feet below a cyclonic jumble of twisting winds in which no pilot could maintain control of his machine.

Such vertical stacking of traffic lanes would be impossibly dangerous in a city because of the dangerous tendency to loss of control where one stream of helicopters—and their prop-wash—crossed above another. The layers would have to be hundreds, if not thousands of feet apart vertically. The dangers of interference from the wash of other machines would make extremely rigid enforcement of wide-spaced lanes essential.

The same considerations naturally apply to any other type of jet or repulsor-beam supported craft. Since a repulsor-beam type ship might theoretically be supported on one very narrow beam, using gyroscopic balance to maintain stability on the single support, they could be packed more closely horizontally.

*Continued on page 94*

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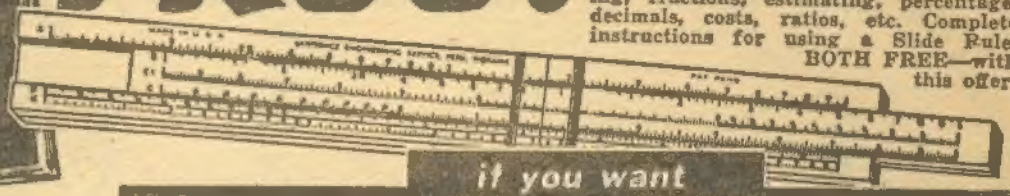

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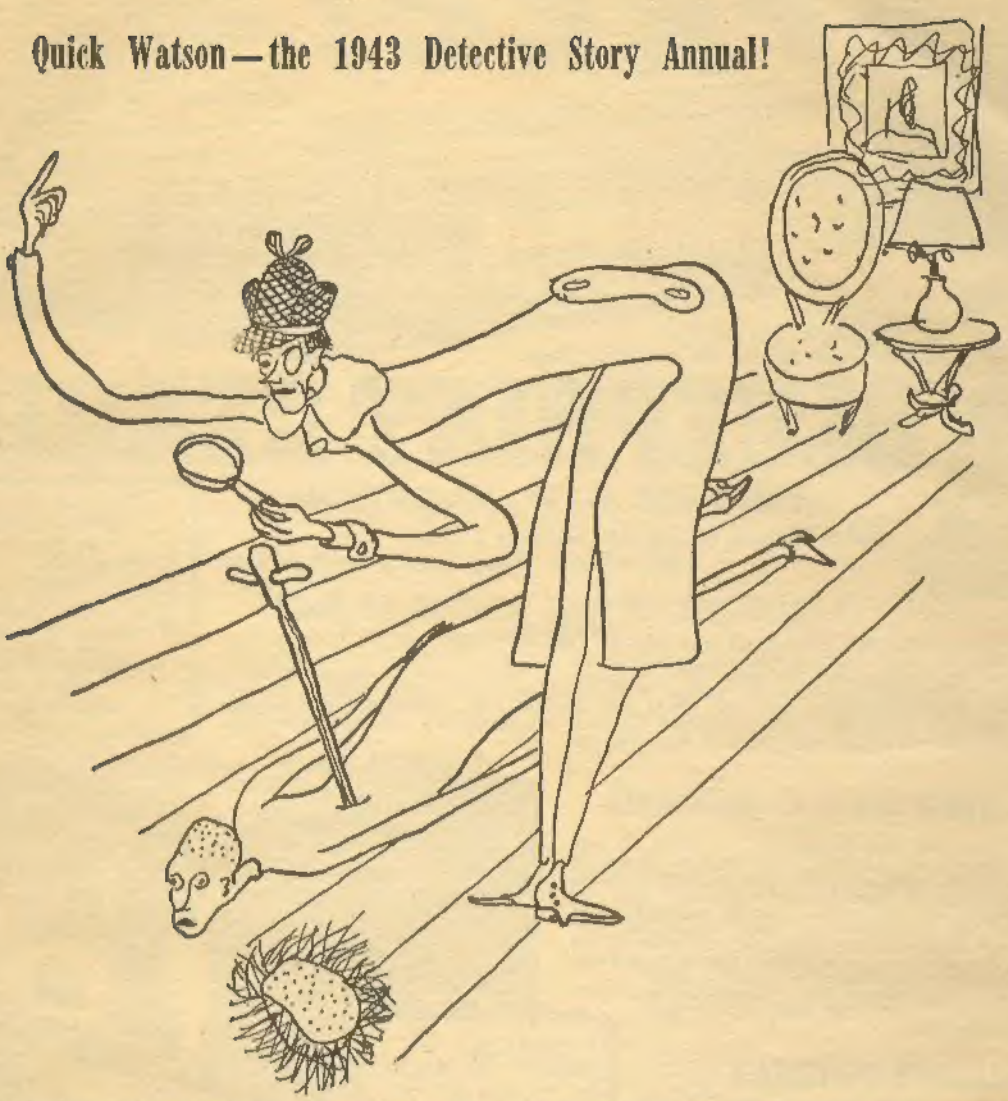

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# CLASH BY NIGHT

## By Lawrence O'Donnell

*THE whole system of which he was a part was doomed, he knew—a mercenary army that fought other mercenary armies for cities that lay beneath the seas of Venus. Yet—there was a fascination and a reasonless loyalty to that futile system that held him.*

Illustrated by Orban

### INTRODUCTION

A half mile beneath the shallow Venusian Sea the black impervium dome that protects Montana Keep rests frowningly on the bottom. Within the Keep is carnival, for the Montanans celebrate the four-hundred-year anniversary of Earthman's landing on Venus. Under the great dome that houses the city all is light and color and gaiety. Masked men and women, bright in celoflex and silks, wander through the broad streets, laughing, drinking the strong native wines of Venus. The sea bottom has been combed, like the hydroponic tanks, for rare delicacies to grace the tables of the nobles.

Through the festival grim shadows stalk, men whose faces mark them unmistakably as members of a Free Company. Their finery cannot disguise that stamp, hard-won through years of battle. Under the domino masks their mouths are hard and harsh. Unlike the undersea dwellers, their skins are burned black with the ultraviolet rays that filter through the cloud layer of Venus. They are skeletons at the feast. They are respected but resented. They are Free Companions—

We are on Venus, nine hundred years ago, beneath the Sea of Shoals, not much north of the equator. But there is a wide range in time and space. All over the cloud planet the underwater Keeps are dotted, and life will not change for many centuries. Looking back, as we do now, from the civilized days of the Thirty-fourth Century, it is too easy to regard the men of the Keeps as savages, groping, stupid and brutal. The Free Companies have long since vanished. The islands and continents of Venus have been tamed, and there is no war.

But in periods of transition, of desperate rivalry, there is always war. The Keeps fought among themselves, each striving to draw the fangs of the others by depriving them of their reserves of korium, the power source of the day. Students of that era find pleasure in sifting the legends and winnowing out the basic social and geopolitical truths. It is fairly well known that only one factor saved the Keeps from annihilating one another—the gentlemen's agreement that left war to the warriors, and allowed the undersea cities to develop their science and social cultures. That particular compromise was, perhaps, inevitable. And it caused the organization of the Free Companies, the roving bands of mercenaries, highly trained for their duties, who hired themselves out to fight for whatever Keeps were attacked or wished to attack.

Ap Towrn, in his monumental "Cycle of Venus," tells the saga through symbolic legends. Many historians have recorded the sober truth, which, unfortunately, seems often Mars-dry. But it is not generally realized that the Free Companions were almost directly responsible for our present high culture. War, because of them, was not permitted to usurp the place of peace-time social and scientific work. Fighting was highly specialized, and, because of technical advances,

manpower was no longer important. Each band of Free Companions numbered a few thousand, seldom more.

It was a strange, lonely life they must have led, shut out from the normal life of the Keeps. They were vestigian but necessary, like the fangs of the marsupians who eventually evolved into Homo sapiens. But without those warriors, the Keeps would have been plunged completely into total war, with fatally destructive results.

Harsh, gallant, indomitable, serving the god of battles so that it might be destroyed—working toward their own obliteration—the Free Companies roar down the pages of history, the banner of Mars streaming above them in the misty air of Venus. They were doomed as Tyrannosaur Rex was doomed, and they fought on as he did, serving, in their strange way, the shape of Minerva that stood behind Mars.

Now they are gone. We can learn much by studying the place they held in the Undersea Period. For, because of them, civilization rose again to the heights it had once reached on Earth, and far beyond.

"These lords shall light the mystery
Of mastery or victory,
And these ride high in history,
But these shall not return."

The Free Companions hold their place in interplanetary literature. They are a legend now, archaic and strange. For they were fighters, and war has gone with unification. But we can understand them a little more than could the people of the Keeps.

This story, built on legends and fact, is about a typical warrior of the period—Captain Brian Scott of Doone's Free Companions. He may never have existed—

## I.

*O, it's Tommy this, an' Tommy that, an' "Tommy, go away";*
*But it's "Thank you, Mr. Atkins," when the band begins to play,*
*The band begins to play, my boys, the band begins to play—*
*O, it's "Thank you, Mr. Atkins," when the band begins to play.*

*—R. Kipling circa 1900*

Scott drank stinging uisqueplus and glowered across the smoky tavern. He was a hard, stocky man, with thick gray-shot brown hair and the scar of an old wound crinkling his chin. He was thirty-odd, looking like the veteran he was, and he had sense enough to wear a plain suit of blue celoflex, rather than the garish silks and rainbow fabrics that were all around him.

Outside, through the transparent walls, a laughing throng was carried to and fro along the movable ways. But in the tavern it was silent, except for the low voice of a harpman as he chanted some old ballad, accompanying himself on his complicated instrument. The song came to an end. There was scattering applause, and, from the hot-box overhead the blaring music of an orchestra burst out. Instantly the restraint was gone. In the booths and at the bar men and women began to laugh and talk with casual unrestraint. Couples were dancing now.

The girl beside Scott, a slim, tan-skinned figure with glossy black ringlets cascading to her shoulders, turned inquiring eyes to him.

"Want to, Brian?"

Scott's mouth twisted in a wry grimace. "Suppose so, Jeana. Eh?" He rose, and she came gracefully into his arms. Brian did not dance too well, but what he lacked in practice he made up in integration. Jeana's heart-shaped face, with its high cheekbones and vividly crimson lips, lifted to him.

"Forget Bienne. He's just trying to ride you."

Scott glanced toward a distant booth, where two girls sat with a man—Commander Fredric Bienne of the Doones. He was a gaunt, tall, bitter-faced man, his regular features twisted into a perpetual sneer, his eyes somber under heavy dark brows. He was pointing, now, toward the couple on the floor.

"I know," Scott said. "He's doing it, too. Well, the hell with him. So I'm a captain now and he's still a commander. That's tough. Next time he'll obey orders and not send his ship out of the line, trying to ram."

"That was it, eh?" Jeana asked. "I wasn't sure. There's plenty of talk."

"There always is. Oh, Bienne's hated me for years. I reciprocate. We simply don't get on together. Never did. Every time I got a promotion, he chewed his nails. Figured he had a longer service record than I had, and deserved to move up faster. But he's too much of an individualist—at the wrong times."

"He's drinking a lot," Jeana said.

"Let him. Three months we've been in Montana Keep. The boys get tired of inaction—being treated like this." Scott nodded toward the door, where a Free Companion was arguing with the keeper. "No noncoms allowed in here. Well, the devil with it."

They could not hear the conversation above the hubbub, but its importance was evident. Presently the soldier shrugged, his mouth forming a curse, and departed. A fat man in scarlet silks shouted encouragement.

"—want any . . . Companions here!"

Scott saw Commander Bienne, his eyes half closed, get up and walk toward the fat man's booth. His shoulder moved in an imperceptible shrug. The hell with civilians, anyhow. Serve the lug right if Bienne smashed his greasy face. And that seemed the probable outcome. For the fat man was accompanied by a girl, and obviously wasn't going to back down, though Bienne, standing too close to him, was saying something insulting, apparently.

The auxiliary hot-box snapped some quick syllables, lost in the general tumult. But Scott's trained ear caught the words. He nodded to Jeana, made a significant clicking noise with his tongue, and said, "This is it."

She, too, had heard. She let Scott go. He headed toward the fat man's booth just in time to see the beginning of a brawl. The civilian, red as a turkey cock, had struck out suddenly, landing purely by accident on Bienne's gaunt cheek. The commander, grinning tightly, stepped back a pace, his fist clenching. Scott caught the other's arm.

"Hold it, commander."

Bienne swung around, glaring. "What business is it of yours? Let—"

The fat man, seeing his opponent's attention distracted, acquired more courage and came in swinging. Scott reached past Bienne, planted his open hand in the civilian's face, and pushed hard. The fat man almost fell backward on his table.

As he rebounded, he saw a gun in Scott's hand. The captain said curtly, "'Tend to your knitting, mister."

The civilian licked his lips, hesitated, and sat down. Under his breath he muttered something about too-damn-cocky Free Companions.

Bienne was trying to break free, ready to swing on the captain. Scott holstered his gun. "Orders," he told the other, jerking his head toward the hot-box. "Get it?"

"—mobilization. Doonemen report to headquarters. Captain Scott to Administration. Immediate mobilization—"

"Oh," Bienne said, though he still scowled. "O. K. I'll take over. There was time for me to take a crack at that louse, though."

"You know what instant mobilization means," Scott grunted. "We may have to leave at an instant's notice. Orders, commander."

Bienne saluted halfheartedly and turned away. Scott went back to his own booth. Jeana had already gathered her purse and gloves and was applying lip juice.

She met his eyes calmly enough.

"I'll be at the apartment, Brian. Luck."

He kissed her briefly, conscious of a surging excitement at the prospect of a new venture. Jeana understood his emotion. She gave him a quick, wry smile, touched his hair lightly, and rose. They went out into the gay tumult of the ways.

Perfumed wind blew into Scott's face. He wrinkled his nose disgustedly. During carnival seasons the Keeps were less pleasant to the Free Companions than otherwise; they felt more keenly the gulf that lay between them and the undersea dwellers. Scott pushed his way through the crowd and took Jeana across the ways to the center fast-speed strip. They found seats.

At a clover-leaf intersection Scott left the girl, heading toward Administration, the cluster of taller buildings in the city's center. The technical and political headquarters were centered here, except for the laboratories, which were in the suburbs near the base of the Dome. There were a few small test-domes a mile or so distant from the city, but these were used only for more precarious experiments. Glancing up, Scott was reminded of the catastrophe that had unified science into something like a freemasonry. Above him, hanging without gravity over a central plaza, was the globe of the Earth, half shrouded by the folds of a black plastic pall. In every Keep on Venus there was a similar ever-present reminder of the lost mother planet.

Scott's gaze went up farther, to the Dome, as though he could penetrate the impervium and the mile-deep layer of water and the clouded atmosphere to the white star that hung in space, one quarter as brilliant as the Sun. A star—all that remained of Earth, since atomic power had been unleashed there two centuries ago. The scourge had spread like flame, melting continents and leveling mountains. In the libraries there were wire-tape pictorial records of the Holocaust. A religious cult—Men of the New Judgment—had sprung up, and advocated the complete destruction of science; followers of that dogma still existed here and there. But the cult's teeth had been drawn when technicians unified, outlawing experiments with atomic power forever, making use of that force punishable by death, and permitting no one to join their society without taking the Minervan Oath.

"—to work for the ultimate good of mankind . . . taking all precaution against harming humanity and science . . . requiring permission from those in authority before undertaking any experiment involving peril to the race . . . remembering always the extent of the trust placed in us and remembering forever the death of the mother planet through misuse of knowledge—"

The Earth. A strange sort of world it must have been, Scott thought. Sunlight, for one thing, unfiltered by the cloud layer. In the old days, there had been few unexplored areas left on Earth. But here on Venus, where the continents had not yet been conquered—there was no need, of course, since everything necessary to life could be produced under the Domes—here on Venus, there was still a frontier. In the Keeps, a highly specialized social culture. Above the surface, a primeval world, where only the Free Companions had their fortresses and navies—the navies for fighting, the forts to house the technicians who provided the latter-day sinews of war, science instead of money. The Keeps tolerated visits from the Free Companions, but would not offer them headquarters, so violent the feeling, so sharp the schism, in the public mind, between war and cultural progress.

Under Scott's feet the sliding way turned into an escalator, carrying him into the Administration Building. He stepped to another way which took him to a lift, and, a moment or two later, was facing the door-curtain bearing the face of President Dane Crosby of Montana Keep.

Crosby's voice said, "Come in, captain," and Scott brushed through the curtain, finding himself in a medium-sized room with muraled walls and a great window overlooking the city. Crosby, a white-haired, thin figure in blue silks, was at his desk. He looked like a tired old clerk out of Dickens, Scott thought suddenly, entirely undistinguished and ordinary. Yet Crosby was one of the greatest socio-politicians on Venus.

Cinc Rhys, leader of Doone's Free Companions, was sitting in a relaxer, the apparent antithesis of Crosby. All the moisture in Rhys' body seemed to have been sucked out of him years ago by ultraviolet actinic, leaving a mummy of brown leather and whipcord sinew. There was no softness in the man. His smile was a grimace. Muscles lay like wire under the swarthy cheeks.

Scott saluted. Rhys waved him to a relaxer. The look of subdued eagerness in the cinc's eyes was significant—an eagle poising himself, smelling blood. Crosby sensed that, and a wry grin showed on his pale face.

"Every man to his trade," he remarked, semi-ironically. "I suppose I'd be bored stiff if I had too long a vacation. But you'll have quite a battle on your hands this time, Cinc Rhys."

Scott's stocky body tensed automatically. Rhys glanced at him.

"Virginia Keep is attacking, captain. They've hired the Helldivers—Flynn's outfit."

There was a pause. Both Free Companions were anxious to discuss the angles, but unwilling to do so in the presence of a civilian, even the president of Montana Keep. Crosby rose.

"The money settlement's satisfactory, then?"

Rhys nodded. "Yes, that's all right. I expect the battle will take place in a couple of days. In the neighborhood of Venus Deep, at a rough guess."

"Good. I've a favor to ask, so if you'll excuse me for a few minutes, I'll—" He left the sentence unfinished and went out through the door-curtain. Rhys offered Scott a cigarette.

"You get the implications, captain—the Helldivers?"

"Yes, sir. Thanks. We can't do it alone."

"Right. We're short on manpower and armament both. And the Helldivers recently merged with O'Brien's Legion, after O'Brien was killed in that polar scrap. They're a strong outfit, plenty strong. Then they've got their specialty—submarine attack. I'd say we'll have to use H-plan 7."

Scott closed his eyes, remembering the files. Each Free Company kept up-to-date plans of attack suited to the merits of every other Company of Venus. Frequently revised as new advances were made, as groups merged, and as the balance of power changed on each side, the plans were so detailed that they could be carried into action at literally a moment's notice. H-plan 7, Scott recalled, involved enlisting the aid of the Mob, a small but well-organized band of Free Companions led by Cinc Tom Mendez.

"Right," Scott said. "Can you get him?"

"I think so. We haven't agreed yet on the bonus. I've been telaudioing him on a tight

beam, but he keeps putting me off—waiting till the last moment, when he can dictate his own terms."

"What's he asking, sir?"

"Fifty thousand cash and a fifty percent cut on the loot."

"I'd say thirty percent would be about right."

Rhys nodded. "I've offered him thirty-five. I may send you to his fort—carte blanche. We can get another Company, but Mendez has got beautiful sub-detectors—which would come in handy against the Helldivers. Maybe I can settle things by audio. If not, you'll have to fly over to Mendez and buy his services, at less than fifty per if you can."

Scott rubbed the old scar on his chin with a calloused forefinger. "Meantime Commander Bienne's in charge of mobilization. When—"

"I telaudioed our fort. Air transports are on the way now."

"It'll be quite a scrap," Scott said, and the eyes of the two men met in perfect understanding. Rhys chuckled dryly.

"And good profits. Virginia Keep has a big supply of korium . . . dunno how much, but plenty."

"What started the fracas this time?"

"The usual thing, I suppose," Rhys said disinterestedly. "Imperialism. Somebody in Virginia Keep worked out a new plan for annexing the rest of the Keeps. Same as usual."

They stood up as the door-curtain swung back, admitting President Crosby, another man, and a girl. The man looked young, his boyish face not yet toughened under actinic burn. The girl was lovely in the manner of a plastic figurine, lit from within by vibrant life. Her blond hair was cropped in the prevalent mode, and her eyes, Scott saw, were an unusual shade of green. She was more than merely pretty—she was instantly exciting.

Crosby said, "My niece, Ilene Kane—and my nephew, Norman Kane." He performed introductions, and they found seats.

"What about drinks?" Ilene suggested. "This is rather revolting formal. The fight hasn't started yet, after all."

Crosby shook his head at her. "You weren't invited here anyway. Don't try to turn this into a party—there isn't too much time, under the circumstances."

"O. K.," Ilene murmured. "I can wait." She eyed Scott interestedly.

Norman Kane broke in. "I'd like to join Doone's Free Companions, sir. I've already applied, but now that there's a battle coming up, I hate to wait till my application's approved. So I thought—"

Crosby looked at Cinc Rhys. "A personal favor, but the decision's up to you. My nephew's a misfit—a romanticist. Never liked the life of a Keep. A year ago he went off and joined Starling's outfit."

Rhys raised an eyebrow. "That gang? It's not a recommendation, Kane. They're not even classed as Free Companions. More like a band of guerrillas, and entirely without ethics. There've even been rumors they're messing around with atomic power."

Crosby looked startled. "I hadn't heard that."

"It's no more than a rumor. If it's ever proved, the Free Companions—all of them—will get together and smash Starling in a hurry."

Norman Kane looked slightly uncomfortable. "I suppose I was rather a fool. But I wanted to get in the fighting game, and Starling's group appealed to me—"

The cinc made a sound in his throat. "They would. Swashbuckling romantics, with no idea of what war means. They've not more than a dozen technicians. And they've no discipline—it's like a pirate outfit. War today, Kane, isn't won by romantic animals dashing at forlorn hopes. The modern soldier is a tactician who knows how to think, integrate, and obey. If you join our Company, you'll have to forget what you learned with Starling."

"Will you take me, sir?"

"I think it would be unwise. You need the training course."

"I've had experience—"

Crosby said, "It would be a favor, Cinc Rhys, if you'd skip the red tape. I'd appreciate it. Since my nephew wants to be a soldier, I'd much prefer to see him with the Doones."

Rhys shrugged. "Very well. Captain Scott will give you your orders, Kane. Remember that discipline is vitally important with us."

The boy tried to force back a delighted grin. "Thank you, sir."

"Captain—"

Scott rose and nodded to Kane. They went out together. In the anteroom was a telaudio set, and Scott called the Doone's local headquarters in Montana Keep. An integrator

answered, his face looking inquiringly from the screen.

"Captain Scott calling, subject induction."

"Yes, sir. Ready to record."

Scott drew Kane forward. "Photosnap this man. He'll report to headquarters immediately. Name, Norman Kane. Enlist him without training course—special orders from Cinc Rhys."

"Acknowledged, sir."

Scott broke the connection. Kane couldn't quite repress his grin.

"All right," the captain grunted, a sympathetic gleam in his eyes. "That fixes it. They'll put you in my command. What's your specialty."

"Flitterboats, sir."

"Good. One more thing. Don't forget what Cinc Rhys said, Kane. Discipline is damned important, and you may not have realized that yet. This isn't a cloak-and-sword war. There are no Charges of Light Brigades. No grandstand plays—that stuff went out with the Crusades. Just obey orders, and you'll have no trouble. Good luck."

"Thank you, sir." Kane saluted and strode out with a perceptible swagger. Scott grinned. The kid would have *that* knocked out of him pretty soon.

A voice at his side made him turn quickly. Ilene Kane was standing there, slim and lovely in her celoflex gown.

"You seem pretty human after all, captain," she said. "I heard what you told Norman."

Scott shrugged. "I did that for his own good—and the good of the Company. One man off the beam can cause plenty trouble, Mistress Kane."

"I envy Norman," she said. "It must be a fascinating life you lead. I'd like it—for a while. Not for long. I'm one of the useless offshoots of this civilization, not much good for anything. So I've perfected one talent."

"What's that?"

"Oh, hedonism, I suppose you'd call it. I enjoy myself. It's not often too boring. But I'm a bit bored now. I'd like to talk to you, captain."

"Well, I'm listening," Scott said.

Ilene Kane made a small grimace. "Wrong semantic term. I'd like to get inside of you psychologically. But painlessly. Dinner and dancing. Can do?"

"There's no time," Scott told her. "We may get our orders any moment." He wasn't sure he wanted to go out with this girl of the Keeps, though there was definitely a subtle fascination for him, an appeal he could not analyze. She typified the most pleasurable part of a world he did not know. The other facets of that world could not impinge on him; geopolitics or nonmilitary science held no appeal, were too alien. But all worlds touch at one point—pleasure. Scott could understand the relaxations of the undersea groups, as he could not understand or feel sympathy for their work or their social impulses.

Cinc Rhys came through the door-curtain, his eyes narrowed. "I've some telaudioing to do, captain," he said. Scott knew what implications the words held: the incipient bargain with Cinc Mendez. He nodded.

"Yes, sir. Shall I report to headquarters?"

Rhys' harsh face seemed to relax suddenly as he looked from Ilene to Scott. "You're free till dawn. I won't need you till then, but report to me at six a. m. No doubt you've a few details to clean up."

"Very well, sir." Scott watched Rhys go out. The cinc had meant Jeana, of course. But Ilene did not know that.

"So?" she asked. "Do I get a turn-down? You might buy me a drink, anyway."

There was plenty of time. Scott said, "It'll be a pleasure," and Ilene linked her arm with his. They took the dropper to ground-level.

As they came out on one of the ways, Ilene turned her head and caught Scott's glance. "I forgot something, captain. You may have a previous engagement. I didn't realize—"

"There's nothing," he said. "Nothing important."

It was true; he felt a mild gratitude toward Jeana at the realization. His relationship with her was the peculiar one rendered advisable by his career. Free-marriage was the word for it; Jeana was neither his wife nor his mistress, but something midway between. The Free Companions had no firmly grounded foundation for social life; in the Keeps they were visitors, and in their coastal forts they were—well, soldiers. One would no more bring a woman to a fort than aboard a ship of the line. So the women of the Free Companions lived in the Keeps, moving from one to another as their men did; and because of the ever-present shadow of death, ties were purposely left loose. Jeana and Scott had been free-married for five years now. Neither made demands on the other. No one expected fidelity of a Free Companion. Soldiers lived

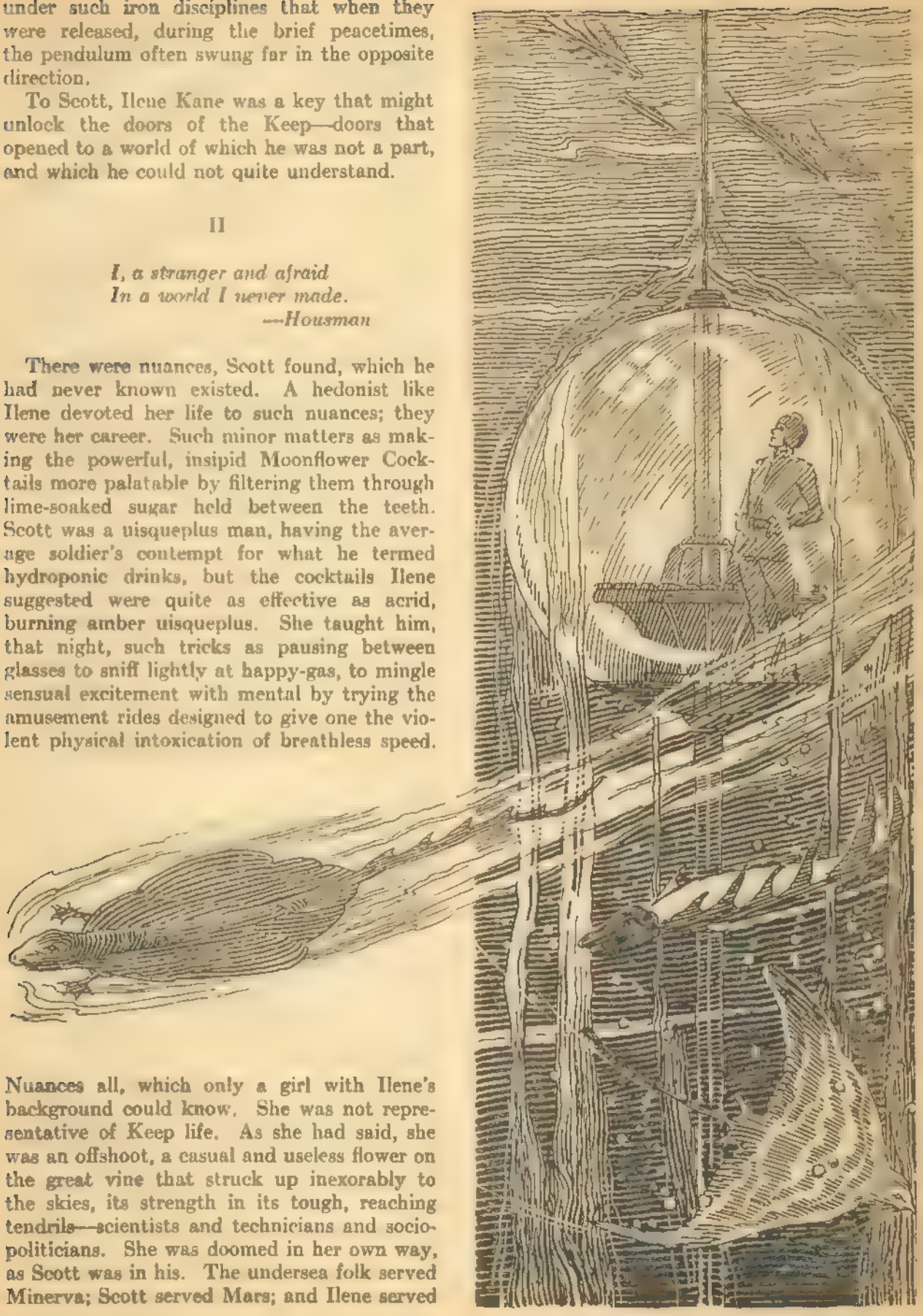
under such iron disciplines that when they were released, during the brief peacetimes, the pendulum often swung far in the opposite direction.

To Scott, Ilene Kane was a key that might unlock the doors of the Keep—doors that opened to a world of which he was not a part, and which he could not quite understand.

II

*I, a stranger and afraid*
*In a world I never made.*
*—Housman*

There were nuances, Scott found, which he had never known existed. A hedonist like Ilene devoted her life to such nuances; they were her career. Such minor matters as making the powerful, insipid Moonflower Cocktails more palatable by filtering them through lime-soaked sugar held between the teeth. Scott was a uisqueplus man, having the average soldier's contempt for what he termed hydroponic drinks, but the cocktails Ilene suggested were quite as effective as acrid, burning amber uisqueplus. She taught him, that night, such tricks as pausing between glasses to sniff lightly at happy-gas, to mingle sensual excitement with mental by trying the amusement rides designed to give one the violent physical intoxication of breathless speed.



Nuances all, which only a girl with Ilene's background could know. She was not representative of Keep life. As she had said, she was an offshoot, a casual and useless flower on the great vine that struck up inexorably to the skies, its strength in its tough, reaching tendrils—scientists and technicians and sociopoliticians. She was doomed in her own way, as Scott was in his. The undersea folk served Minerva; Scott served Mars; and Ilene served

Aphrodite—not purely the sexual goddess, but the patron of arts and pleasure. Between Scott and Ilene was the difference between Wagner and Strauss; the difference between crashing chords and tinkling arpeggios. In both was a muted bittersweet sadness, seldom realized by either. But that undertone was brought out by their contact. The sense of dim hopelessness in each responded to the other.

It was carnival, but neither Ilene nor Scott wore masks. Their faces were masks enough, and both had been trained to reserve, though in different ways. Scott's hard mouth kept its tight grimness even when he smiled. And Ilene's smiles came so often that they were meaningless.

Through her, Scott was able to understand more of the undersea life than he had ever done before. She was for him a catalyst. A tacit understanding grew between them, not needing words. Both realized that, in the course of progress, they would eventually die out. Mankind tolerated them because that was necessary for a little time. Each responded differently. Scott served Mars; he served actively; and the girl, who was passive, was attracted by the antithesis.

Scott's drunkenness struck psychically deep. He did not show it. His stiff silver-brown hair was not disarranged, and his hard, burned face was impassive as ever. But when his brown eyes met Ilene's green ones a spark of—something—met between them.

Color and light and sound. They began to form a pattern now, were not quite meaningless to Scott. They were, long past midnight, sitting in an Olympus, which was a private cosmos. The walls of the room in which they were seemed nonexistent. The gusty tides of gray, faintly luminous clouds seemed to drive chaotically past them, and, dimly, they could hear the muffled screaming of an artificial wind. They had the isolation of the gods.

*And the Earth was without form, and void; and darkness was upon the face of the deep*—That was, of course, the theory of the Olympus rooms. No one existed, no world existed, outside of the chamber; values automatically shifted, and inhibitions seemed absurd.

Scott relaxed on a translucent cushion like a cloud. Beside him, Ilene lifted the bit of a happy-gas tube to his nostrils. He shook his head.

"Not now, Ilene."

She let the tube slide back into its reel. "Nor I. Too much of anything is unsatisfactory, Brian. There should always be something untasted, some anticipation left— You have that. I haven't."

"How?"

"Pleasures—well, there's a limit. There's a limit to human endurance. And eventually I build up a resistance psychically, as I do physically, to everything. With you, there's always the last adventure. You never know when death will come. You can't plan. Plans are dull; it's the unexpected that's important."

Scott shook his head slightly. "Death isn't important either. It's an automatic cancellation of values. Or, rather—" He hesitated, seeking words. "In this life you can plan, you can work out values, because they're all based on certain conditions. On—let's say—arithmetic. Death is a change to a different plane of conditions, quite unknown. Arithmetical rules don't apply as such to geometry."

"You think death has its rules?"

"It may be a lack of rules, Ilene. One lives realizing that life is subject to death; civilization is based on that. That's why civilization concentrates on the race instead of the individual. Social self-preservation."

She looked at him gravely. "I didn't think a Free Companion could theorize that way."

Scott closed his eyes, relaxing. "The Keeps know nothing about Free Companions. They don't want to. We're men. Intelligent men. Our technicians are as great as the scientists under the Domes."

"But they work for war."

"War's necessary," Scott said. "Now, anyway."

"How did you get into it? Should I ask?"

He laughed a little at that. "Oh, I've no dark secrets in my past. I'm not a runaway murderer. One—drifts. I was born in Australia Keep. My father was a tech, but my grandfather had been a soldier. I guess it was in my blood. I tried various trades and professions. Meaningless. I wanted something that . . . hell, I don't know. Something, maybe, that needs all of a man. Fighting does. It's like a religion. Those cultists—Men of the New Judgment—they're fanatics, but you can see that their religion is the only thing that matters to them."

"Bearded, dirty men with twisted minds, though."

"It happens to be a religion based on false premises. There are others, appealing to dif-

ferent types. But religion was too passive for me, in these days."

Ilene examined his harsh face. "You'd have preferred the church militant—the Knights of Malta, fighting Saracens."

"I suppose. I had no values. Anyhow, I'm a fighter."

"Just how important is it to you? The Free Companions?"

Scott opened his eyes and grinned at the girl. He looked unexpectedly boyish.

"Damn little, really. It has emotional appeal. Intellectually, I know that it's a huge fake. Always has been. As absurd as the Men of the New Judgment. Fighting's doomed. So we've no real purpose. I suppose most of us know there's no future for the Free Companions. In a few hundred years—well!"

"And still you go on. Why? It isn't money."

"No. There is a . . . a drunkenness to it. The ancient Norsemen had their berserker madness. We have something similar. To a Dooneman, his group is father, mother, child, and God Almighty. He fights the other Free Companions when he's paid to do so, but he doesn't hate the others. They serve the same toppling idol. And it *is* toppling, Ilene. Each battle we win or lose brings us closer to the end. We fight to protect the culture that eventually will wipe us out. The Keeps—when they finally unify, will they need a military arm? I can see the trend. If war was an essential part of civilization, each Keep would maintain its own military. But they shut us out—a necessary evil. If they would end war now!" Scott's fist unconsciously clenched. "So many men would find happier places in Venus—undersea. But as long as the Free Companions exist, there'll be new recruits."

Ilene sipped her cocktail, watching the gray chaos of clouds flow like a tide around them. In the dimly luminous light Scott's face seemed like dark stone, flecks of brightness showing in his eyes. She touched his hand gently.

"You're a soldier, Brian. You wouldn't change."

His laugh was intensely bitter. "Like hell I wouldn't, Mistress Ilene Kane! Do you think fighting's just pulling a trigger? I'm a military strategist. That took ten years. Harder cramming than I'd have had in a Keep Tech-Institute. I have to know everything about war from trajectories to mass psychology. This is the greatest science the System has ever known, and the most useless. Because war will die in a few centuries at most. Ilene—you've never seen a Free Company's fort. It's science, marvelous science, aimed at military ends only. We have our psych-specialists. We have our engineers, who plan everything from ordnance to the frictional quotient on flitterboats. We have the foundries and mills. Each fortress is a city made for war, as the Keeps are made for social progress."

"As complicated as that?"

"Beautifully complicated and beautifully useless. There are so many of us who realize that. Oh, we fight—it's a poison. We worship the Company—that is an emotional poison. But we live only during wartime. It's an incomplete life. Men in the Keeps have full lives; they have their work, and their relaxations are geared to fit them. We don't fit."

"Not all the undersea races," Ilene said. "There's always the fringe that doesn't fit. At least you have a *raison d'être*. You're a soldier. I can't make a lifework out of pleasure. But there's nothing else for me."

Scott's fingers tightened on hers. "You're the product of a civilization, at least. I'm left out."

"With you, Brian, it might be better. For a while. I don't think it would last for long."

"It might."

"You think so now. It's quite a horrible thing, feeling yourself a shadow."

"I know."

"I want you, Brian," Ilene said, turning to face him. "I want you to come to Montana Keep and stay here. Until our experiment fails. I think it'll fail presently. But, perhaps, not for some time. I need your strength. I can show you how to get the most out of this sort of life—how to enter into it. True hedonism. You can give me—companionship perhaps. For me the companionship of hedonists who know nothing else isn't enough."

Scott was silent. Ilene watched him for a while.

"Is war so important?" she asked at last.

"No," he said, "it isn't at all. It's a balloon. And it's empty, I know that. Honor of the regiment!" Scott laughed. "I'm not hesitating, really. I've been shut out for a long time. A social unit shouldn't be founded on an obviously doomed fallacy. Men and women are important, nothing else, I suppose."

"Men and women—or the race?"

"Not the race," he said with abrupt violence. "Damn the race! It's done nothing for me. I can fit myself into a new life. Not necessarily hedonism. I'm an expert in several lines; I have to be. I can find work in Montana Keep."

"If you like. I've never tried. I'm more of a fatalist, I suppose. But . . . what about it, Brian?"

Her eyes were almost luminous, like shining emerald, in the ghostly light.

"Yes," Scott said. "I'll come back. To stay."

Ilene said, "Come back? Why not stay now?"

"Because I'm a complete fool, I guess. I'm a key man, and Cinc Rhys needs me just now."

"Is it Rhys or the Company?"

Scott smiled crookedly. "Not the Company. It's just a job I have to do. When I think how many years I've been slaving, pretending absurdities were important, knowing that I was bowing to a straw dummy— *No!* I want your life—the sort of life I didn't know could exist in the Keeps. I'll be back, Ilene. It's something more important than love. Separately we're halves. Together we may be a complete whole."

She didn't answer. Her eyes were steady on Scott's. He kissed her.

Before morning bell he was back in the apartment. Jeana had already packed the necessary light equipment. She was asleep, her dark hair cascading over the pillow, and Scott did not waken her. Quietly he shaved, showered, and dressed. A heavy, waiting silence seemed to fill the city like a cup brimmed with stillness.

As he emerged from the bathroom, buttoning his tunic, he saw the table had been let down and two places set at it. Jeana came in, wearing a cool morning frock. She set cups down and poured coffee.

"Morning, soldier," she said. "You've time for this, haven't you?"

"Uh-huh." Scott kissed her, a bit hesitantly. Up till this moment, the breaking with Jeana had seemed easy enough. She would raise no objections. That was the chief reason for free-marriage. However—

She was sitting in the relaxer, sweeting the coffee, opening a fresh celopack of cigarettes. "Hung over?"

"No. I vitamized. Feel pretty good." Most bars had a vitamizing chamber to nullify the effects of too much stimulant. Scott was, in fact, feeling fresh and keenly alert. He was wondering how to broach the subject of Ilene to Jeana.

She saved him the trouble.

"If it's a girl, Brian, just take it easy. No use doing anything till this war's over. How long will it take?"

"Oh, not long. A week at most. One battle may settle it, you know. The girl—"

"She's not a Keep girl."

"Yes."

Jeana looked up, startled. "You're crazy."

"I started to tell you," Scott said impatiently. "It isn't just—her. I'm sick of the Doones. I'm going to quit."

"Hm-m-m. Like that?"

"Like that."

Jeana shook her head. "Keep women aren't tough."

"They don't need to be. Their men aren't, soldiers."

"Have it your own way. I'll wait till you get back. Maybe I've got a hunch. You see, Brian, we've been together for five years. We fit. Not because of anything like philosophy or psychology—it's a lot more personal. It's just us. As man and woman, we get along comfortably. There's love, too. Those close emotional feelings are more important, really, than the long view. You can get excited about futures, but you can't live them."

Scott shrugged. "Could be I'm starting to forget about futures. Concentrating on Brian Scott."

"More coffee . . . there. Well, for five years now I've gone with you from Keep to Keep, waiting every time you went off to war, wondering if you'd come back, knowing that I was just a part of your life, but—I sometimes thought—the most important part. Soldiering's seventy-five percent. I'm the other quarter. I think you need that quarter—you need the whole thing, in that proportion, actually. You could find another woman, but she'd have to be willing to take twenty-five percent."

Scott didn't answer. Jeana blew smoke through her nostrils.

"O. K., Brian. I'll wait."

"It isn't the girl so much. She happens to fit into the pattern of what I want. You—"

"I'd never be able to fit that pattern," Jeana said softly. "The Free Companions need women who are willing to be soldiers' wives. Free-wives, if you like. Chiefly it's a matter of not being too demanding. But there are

other things. No, Brian. Even if you wanted that, I couldn't make myself over into one of the Keep people. It wouldn't be me. I wouldn't respect myself, living a life that'd be false to me; and you wouldn't like me that way either. I couldn't and wouldn't change. I'll have to stay as I am. A soldier's wife. As long as you're a Dooneman, you'll need me. But if *you* change—" She didn't finish.

Scott lit a cigarette, scowling. "It's hard to know, exactly."

"I may not understand you, but I don't ask questions and I don't try to change you. As long as you want that, you can have it from me. I've nothing else to offer you. It's enough for a Free Companion. It's not enough—or too much—for a Keep-dweller."

"I'll miss you," he said.

"That'll depend, too. I'll miss you." Under the table her fingers writhed together, but her face did not change. "It's getting late. Here, let me check your chronometer." Jeana leaned across the table, lifted Scott's wrist, and compared his watch with the central-time clock on the wall. "O. K. On your way, soldier."

Scott stood up, tightening his belt. He bent to kiss Jeana, and, though she began to turn her face away, after a moment she raised her lips to his.

They didn't speak. Scott went out quickly, and the girl sat motionless, the cigarette smoldering out unheeded between her fingers. Somehow it did not matter so much, now, that Brian was leaving her for another woman and another life. As always, the one thing of real importance was that he was going into danger.

*Guard him from harm,* she thought, not knowing that she was praying. *Guard him from harm!*

And now there would be silence, and waiting. That, at least, had not changed. Her eyes turned to the clock.

Already the minutes were longer.

## III.

*'E's the kind of a giddy harumfrodite—soldier an' sailor too!*

*Kipling*

Commander Bienne was superintending the embarkation of the last Doonemen when Scott arrived at headquarters. He saluted the captain briskly, apparently untired by his night's work of handling the transportation routine.

"All checked, sir."

Scott nodded. "Good. Is Cinc Rhys here?"

"He just arrived." Bienne nodded toward a door-curtain. As Scott moved away, the other followed.

"What's up, commander?"

Bienne pitched his voice low. "Bronson's laid up with endemic fever." He forgot to say "sir." "He was to handle the left wing of the fleet. I'd appreciate that job."

"I'll see if I can do it."

Bienne's lips tightened, but he said nothing more. He turned back to his men, and Scott went on into the cinc's office. Rhys was at the telaudio. He looked up, his eyes narrowed.

"Morning, captain. I've just heard from Mendez."

"Yes, sir?"

"He's still holding out for a fifty percent cut on the korium ransom from Virginia Keep. You'll have to see him. Try and get the Mob for less than fifty if you can. Telaudio me from Mendez's fort."

"Check, sir."

"Another thing. Bronson's in sick bay."

"I heard that. If I may suggest Commander Bienne to take his place at left-wing command—"

But Cinc Rhys raised his hand. "Not this time. We can't afford individualism. The commander tried to play a lone hand in the last war. You know we can't risk it till he's back in line—thinking of the Doones instead of Fredric Bienne."

"He's a good man, sir. A fine strategist."

"But not yet a good integrating factor. Perhaps next time. Put Commander Geer on the left wing. Keep Bienne with you. He needs discipline. And—take a flitterboat to Mendez."

"Not a plane?"

"One of the technicians just finished a new tight-beam camouflager for communications. I'm having it installed immediately on all our planes and gliders. Use the boat; it isn't far to the Mob's fort—that long peninsula on the coast of Southern Hell."

Even on the charts that continent was named Hell—for obvious reasons. Heat was only one of them. And, even with the best equipment, a party exploring the jungle there would soon find itself suffering the tortures of the damned. On the land of Venus, flora and fauna combined diabolically to make the place

uninhabitable to Earthmen. Many of the plants even exhaled poisonous gases. Only the protected coastal forts of the Free Companies could exist—and that was because they *were* forts.

Cinc Rhys frowned at Scott. "We'll use H-plan 7 if we can get the Mob. Otherwise we'll have to fall back on another outfit, and I don't want to do that. The Helldivers have too many subs, and we haven't enough detectors. So do your damnedest."

Scott saluted. "I'll do that, sir." Rhys waved him away, and he went out into the next room, finding Commander Bienne alone. The officer turned an inquiring look toward him.

"Sorry," Scott said. "Geer gets the left-wing command this time."

Bienne's sour face turned dark red. "I'm sorry I didn't take a crack at you before mobilization," he said. "You hate competition, don't you?"

Scott's nostrils flared. "If it had been up to me, you'd have got that command, Bienne."

"Sure. I'll bet. All right, captain. Where's my bunk? A flitterboat?"

"You'll be on right wing, with me. Control ship *Flintlock*."

"With you. Under you, you mean," Bienne said tightly. His eyes were blazing. "Yeah."

Scott's dark cheeks were flushed too. "Orders, commander," he snapped. "Get me a flitterboat pilot. I'm going topside."

Without a word Bienne turned to the telaudio. Scott, a tight, furious knot in his stomach, stamped out of headquarters, trying to fight down his anger. Bienne was a jackass. A lot he cared about the Doones—

Scott caught himself and grinned sheepishly. Well, he cared little about the Doones himself. But while he was in the Company, discipline was important—integration with the smoothly running fighting machine. No place for individualism. One thing he and Bienne had in common; neither had any sentiment about the Company.

He took a lift to the ceiling of the Dome. Beneath him Montana Keep dropped away, shrinking to doll size. Somewhere down there, he thought, was Ilene. He'd be back. Perhaps this war would be a short one—not that they were ever much longer than a week, except in unusual cases where a Company developed new strategies.

He was conducted through an air lock into a bubble, a tough, transparent sphere with a central vertical core through which the cable ran. Except for Scott, the bubble was empty. After a moment it started up with a slight jar. Gradually the water outside the curving walls changed from black to deep green, and thence to translucent chartreuse. Sea creatures were visible, but they were nothing new to Scott; he scarcely saw them.

The bubble broke surface. Since air pressure had been constant, there was no possibility of the bends, and Scott opened the panel and stepped out on one of the buoyant floats that dotted the water above Montana Keep. A few sightseers crowded into the chamber he had left, and presently it was drawn down, out of sight.

In the distance Free Companions were embarking from a larger float to an air ferry. Scott glanced up with a weather eye. No storm, he saw, though the low ceiling was, as usual, torn and twisted into boiling currents by the winds. He remembered, suddenly, that the battle would probably take place over Venus Deep. That would make it somewhat harder for the gliders—there would be few of the thermals found, for instance, above the Sea of Shallows here.

A flitterboat, low, fast, and beautifully maneuverable, shot in toward the quay. The pilot flipped back the overhead shell and saluted Scott. It was Norman Kane, looking shipshape in his tight-fitting gray uniform, and apparently ready to grin at the slightest provocation.

Scott jumped lightly down into the craft and seated himself beside the pilot. Kane drew the transparent shell back over them. He looked at Scott.

"Orders, captain?"

"Know where the Mob's fort is? Good. Head there. Fast."

Kane shot the flitterboat out from the float with a curtain of v-shaped spray rising from the bow. Drawing little water, maneuverable, incredibly fast, these tiny craft were invaluable in naval battle. It was difficult to hit one, they moved so fast. They had no armor to slow them down. They carried high-explosive bullets fired from small-caliber guns, and were, as a rule, two-man craft. They complemented the heavier ordnance of the battlewagons and destroyers.

Scott handed Kane a cigarette. The boy hesitated.

"We're not under fire," the captain chuckled.

"Discipline clamps down during a battle, but it's O. K. for you to have a smoke with me. Here!" He lit the white tube for Kane.

"Thanks, sir. I guess I'm a bit—overanxious?"

"Well, war has its rules. Not many, but they mustn't be broken." Both men were silent for a while, watching the blank gray surface of the ocean ahead. A transport plane passed them, flying low.

"Is Ilene Kane your sister?" Scott asked presently.

Kane nodded. "Yes, sir."

"Thought so. If she'd been a man, I imagine she'd have been a Free Companion."

The boy shrugged. "Oh, I don't know. She doesn't have the— I don't know. She'd consider it too much effort. She doesn't like discipline."

"Do you?"

"It's fighting that's important to me. Sir." That was an afterthought. "Winning, really."

"You can lose a battle even though you win it," Scott said rather somberly.

"Well, I'd rather be a Free Companion than do anything else I know of. Not that I've had much experience—"

"You've had experience of war with Starling's outfit, but you probably learned some dangerous stuff at the same time. War isn't swashbuckling piracy these days. If the Doones tried to win battles by that sort of thing, there'd be no more Doones in a week or so."

"But—" Kane hesitated. "Isn't that sort of thing rather necessary? Taking blind chances, I mean—"

"There are desperate chances," Scott told him, "but there are no blind chances in war—not to a good soldier. When I was green in the service, I ran a cruiser out of the line to ram. I was demoted, for a very good reason. The enemy ship I rammed wasn't as important to the enemy as our cruiser was to us. If I'd stayed on course, I'd have helped sink three or four ships instead of disabling one and putting my cruiser out of action. It's the great god integration we worship, Kane. It's much more important now than it ever was on Earth, because the military has consolidated. Army, navy, air, undersea—they're all part of one organization now. I suppose the only important change was in the air."

"Gliders, you mean? I knew powered planes couldn't be used in battle."

"Not in the atmosphere of Venus," Scott agreed. "Once powered planes get up in the cloud strata, they're fighting crosscurrents and pockets so much they've got no time to do accurate firing. If they're armored, they're slow. If they're light, detectors can spot them and antiaircraft can smash them. Unpowered gliders are valuable not for bombing but for directing attacks. They get into the clouds, stay hidden, and use infrared telecameras which are broadcast on a tight beam back to the control ships. They're the eyes of the fleet. They can tell us— *White water ahead, Kane! Swerve!*"

The pilot had already seen the ominous boiling froth foaming out in front of the bow. Instinctively he swung the flitterboat in a wrenching turn. The craft heeled sidewise, throwing its occupants almost out of their seats.

"Sea beast?" Scott asked, and answered his own question. "No, not with those spouts. It's volcanic. And it's spreading fast."

"I can circle it, sir," Kane suggested.

Scott shook his head. "Too dangerous. Backtrack."

Obediently the boy sent the flitterboat racing out of the area of danger. Scott had been right about the extent of the danger; the boiling turmoil was widening almost faster than the tiny ship could flee. Suddenly the line of white water caught up with them. The flitterboat jounced like a chip, the wheel being nearly torn from Kane's grip. Scott reached over and helped steady it. Even with two men handling the wheel, there was a possibility that it might wrench itself free. Steam rose in veils beyond the transparent shell. The water had turned a scummy brown under the froth.

Kane jammed on the power. The flitterboat sprang forward like a ricocheting bullet, dancing over the surface of the seething waves. Once they plunged head-on into a swell, and a screaming of outraged metal vibrated through the craft. Kane, tight-lipped, instantly slammed in the auxiliary, cutting out the smashed motor unit. Then, unexpectedly, they were in clear water, cutting back toward Montana Keep.

Scott grinned. "Nice handling. Lucky you didn't try to circle. We'd never have made it."

"Yes, sir." Kane took a deep breath. His eyes were bright with excitement.

"Circle now. Here." He thrust a lighted cigarette between the boy's lips. "You'll be a good Dooneman, Kane. Your reactions are good and fast."

"Thanks, sir."

Scott smoked silently for a while. He glanced toward the north, but, with the poor visibility, he could not make out the towering range of volcanic peaks that were the backbone of Southern Hell. Venus was a comparatively young planet, the internal fires still bursting forth unexpectedly. Which was why no forts were ever built on islands—they had an unhappy habit of disappearing without warning!

The flitterboat rode hard, at this speed, despite the insulating system of springs and shock absorbers. After a ride in one of these "spankers"—the irreverent name the soldiers had for them—a man needed arnica if not a chiropractor. Scott shifted his weight on the soft air cushions under him, which felt like cement.

Under his breath he hummed:

*"It ain't the 'eavy 'aulin' that 'urts the 'orses' 'oofs,*
*It's the 'ammer, 'ammer, 'ammer on the 'ard 'ighway!"*

The flitterboat scooted on, surrounded by monotonous sea and cloud, till finally the rampart of the coast grew before the bow, bursting suddenly from the fog-veiled horizon. Scott glanced at his chronometer and sighed with relief. They had made good time, in spite of the slight delay caused by the subsea volcano.

The fortress of the Mob was a huge metal and stone castle on the tip of the peninsula. The narrow strip that separated it from the mainland had been cleared, and the pockmarks of shell craters showed where guns had driven back onslaughts from the jungle—the reptilian, ferocious giants of Venus, partially intelligent but absolutely untractable because of the gulf that existed between their methods of thinking and the culture of mankind. Overtures had been made often enough; but it had been found that the reptile-folk were better left alone. They would not parley. They were

blindly bestial savages, with whom it was impossible to make truce. They stayed in the jungle, emerging only to hurl furious attacks at the forts—attacks doomed to failure, since fang and talon were matched against lead-jacketed bullet and high explosive.

As the flitterboat shot in to a jetty, Scott kept his eyes straight ahead—it was not considered good form for a Free Companion to seem too curious when visiting the fort of another Company. Several men were on the quay, apparently waiting for him. They saluted as Scott stepped out of the boat.

He gave his name and rank. A corporal stepped forward.

"Cinc Mendez is expecting you, sir. Cinc Rhys telaudioed an hour or so back. If you'll come this way—"

"All right, corporal. My pilot—"

"He'll be taken care of, sir. A rubdown and a drink, perhaps, after a spanker ride."

Scott nodded and followed the other into the bastion that thrust out from the overhanging wall of the fort. The sea gate was open, and he walked swiftly through the courtyard in the corporal's wake, passing a doorcurtain, mounting an escalator, and finding himself, presently, before another curtain that bore the face of Cinc Mendez, plump, hoglike, and bald as a bullet.

Entering, he saw Mendez himself at the head of a long table, where nearly a dozen officers of the Mob were also seated. In person Mendez was somewhat more prepossessing than in effigy. He looked like a boar rather than a pig—a fighter, not a gourmand. His sharp black eyes seemed to drive into Scott with the impact of a physical blow.

He stood up, his officers following suit. "Sit down, captain. There's a place at the foot of the table. No reflections on rank, but I prefer to be face to face with the man I'm dealing with. But first—you just arrived? If you'd like a quick rubdown, we'll be glad to wait."

Scott took his place. "Thank you, no, Cinc Mendez. I'd prefer not to lose time."

"Then we'll waste none on introductions. However, you can probably stand a drink." He spoke to the orderly at the door, and presently a filled glass stood at Scott's elbow.

His quick gaze ran along the rows of faces. Good soldiers, he thought—tough, well trained, and experienced. They had been under fire. A small outfit, the Mob, but a powerful one.

Cinc Mendez sipped his own drink. "To business. The Doonemen wish to hire our help in fighting the Helldivers. Virginia Keep has bought the services of the Helldivers to attack Montana Keep." He enumerated on stubby fingers. "You offer us fifty thousand cash and thirty-five percent of the korium ransom. So?"

"That's correct."

"We ask fifty percent."

"It's high. The Doones have superior manpower and equipment."

"To us, not to the Helldivers. Besides, the percentage is contingent. If we should lose, we get only the cash payment."

Scott nodded. "That's correct, but the only real danger from the Helldivers is their submarine corps. The Doones have plenty of surface and air equipment. We might lick the Helldivers without you."

"I don't think so." Mendez shook his bald head. "They have some new underwater torpedoes that make hash out of heavy armor plate. But *we* have new sub-detectors. We can blast the Helldivers' subs for you before they get within torpedo range."

Scott said bluntly, "You've been stalling, Cinc Mendez. We're not that bad off. If we can't get you, we'll find another outfit."

"With sub-detectors?"

"Yardley's Company is good at undersea work."

A major near the head of the table spoke up. "That's true, sir. They have suicide subs—not too dependable, but they have them."

Cinc Mendez wiped his bald head with his palms in a slow circular motion. "Hm-m-m. Well, captain, I don't know. Yardley's Company isn't as good as ours for this job."

"All right," Scott said, "I've *carte blanche*. We don't know how much korium Virginia Keep has in her vaults. How would this proposition strike you: the Mob gets fifty percent of the korium ranson up to a quarter of a million; thirty-five percent above that."

"Forty-five."

"Forty, above a quarter of a million; forty-five below that sum."

"Gentlemen?" Cinc Mendez asked, looking down the table. "Your vote?"

There were several ayes, and a scattering of nays. Mendez shrugged.

"Then I have the deciding vote. Very well. We get forty-five percent of the Virginia Keep ransom up to a quarter of a million; forty per-

cent on any amount above that. Agreed. We'll drink to it."

Orderlies served drinks. As Mendez rose, the others followed his example. The cinc nodded to Scott.

"Will you propose a toast, captain?"

"With pleasure. Nelson's toast, then—a willing foe and sea room!"

They drank to that, as Free Companions had always drunk that toast on the eve of battle. As they seated themselves once more, Mendez said, "Major Matson, please telaudio Cinc Rhys and arrange details. We must know his plans."

"Yes, sir."

Mendez glanced at Scott. "Now how else may I serve you?"

"Nothing else. I'll get back to our fort. Details can be worked out on the telaudio, on tight beam."

"If you're going back in that flitterboat," Mendez said sardonically, "I strongly advise a rubdown. There's time to spare, now we've come to an agreement."

Scott hesitated. "Very well. I'm . . . uh . . . starting to ache." He stood up. "Oh, one thing I forgot. We've heard rumors that Starling's outfit is using atomic power."

Mendez's mouth twisted into a grimace of distaste. "Hadn't heard that. Know anything about it, gentlemen?"

Heads were shaken. One officer said, "I've heard a little talk about it, but only talk, so far."

Mendez said, "After this war, we'll investigate further. If there's truth in the story, we'll join you, of course, in mopping up the Starlings. No court-martial is necessary for *that* crime!"

"Thanks. I'll get in touch with other Companies and see what they've heard. Now, if you'll excuse me—"

He saluted and went out, exultation flaming within him. The bargain had been a good one—for the Doonemen badly needed the Mob's help against the Helldivers. Cinc Rhys would be satisfied with the arrangement.

An orderly took him to the baths, where a rubdown relaxed his aching muscles. Presently he was on the quay again, climbing into the flitterboat. A glance behind him showed that the gears of war were beginning to grind. There was little he could see, but men were moving about through the courtyard with purposeful strides, to the shops, to administration, to the laboratories. The battlewagons were anchored down the coast, Scott knew, in a protected bay, but they would soon move out to their rendezvous with the Doones.

Kane, at the controls of the flitterboat, said, "They repaired the auxiliary unit for us, sir."

"Courtesies of the trade." Scott lifted a friendly hand to the men on the quay as the boat slid toward open water. "The Doone fort, now. Know it?"

"Yes, sir. Are . . . are the Mob fighting with us, if I may ask?"

"They are. And they're a grand lot of fighters. You're going to see action, Kane. When you hear battle stations next, it's going to mean one of the sweetest scraps that happened on Venus. Push down that throttle—we're in a hurry!"

The flitterboat raced southwest at top speed, its course marked by the flying V of spray.

"One last fight," Scott thought to himself. "I'm glad it's going to be a good one."

## IV.

*We eat and drink our own damnation.*
*—The Book of Common Prayer*

The motor failed when they were about eight miles from the Doone fort.

It was a catastrophe rather than merely a failure. The overstrained and overheated engine, running at top speed, blew back. The previous accident, at the subsea volcano, had brought out hidden flaws in the alloy which the Mob's repair men had failed to detect, when they replaced the smashed single unit. Sheer luck had the flitterboat poised on a swell when the crack-up happened. The engine blew out and down, ripping the bow to shreds. Had they been bow-deep, the blast would have been unfortunate for Scott and the pilot—more so than it was.

They were perhaps a half mile from the shore. Scott was deafened by the explosion and simultaneously saw the horizon swinging in a drunken swoop. The boat turned turtle, the shell smacking into water with a loud cracking sound. But the plastic held. Both men were tangled together on what had been their ceiling, sliding forward as the flitterboat began to sink bow first. Steam sizzled from the ruined engine.

Kane managed to touch one of the emergency buttons. The shell was, of course,

jammed, but a few of the segments slid aside, admitting a gush of acrid sea water. For a moment they struggled there, fighting the crosscurrents till the air had been displaced. Scott, peering through cloudy green gloom, saw Kane's dark shadow twist and kick out through a gap. He followed.

Beneath him the black bulk of the boat dropped slowly and was gone. His head broke surface, and he gasped for breath, shaking droplets from his lashes and glancing around. Where was Kane?

The boy appeared, his helmet gone, sleek hair plastered to his forehead. Scott caught his eye and pulled the trigger on his life vest, the inflatable undergarment which was always worn under the blouse on sea duty. As chemicals mixed, light gas rushed into the vest, lifting Scott higher in the water. He felt the collar cushion inflate against the back of his head—the skull-fitting pillow that allowed shipwrecked men to float and rest without danger of drowning in their sleep. But he had no need for this now.

Kane, he saw, had triggered his own life vest. Scott hurled himself up, searching for signs of life. There weren't any. The gray-green sea lay desolate to the misty horizon. A half mile away was a mottled chartreuse wall that marked the jungle. Above and beyond that dim sulphurous red lit the clouds.

Scott got out his leaf-bladed smatchet, gesturing for Kane to do the same. The boy did not seem worried. No doubt this was merely an exciting adventure for him, Scott thought wryly. Oh, well.

Gripping the smatchet between his teeth, the captain began to swim shoreward. Kane kept at his side. Once Scott warned his companion to stillness and bent forward, burying his face in the water and peering down at a great dim shadow that coiled away and was gone—a sea snake, but, luckily, not hungry. The oceans of Venus were perilous with teeming, ferocious life. Precautions were fairly useless. When a man was once in the water, it was up to him to get out of it as rapidly as possible.

Scott touched a small cylinder attached to his belt and felt bubbles rushing against his palm. He was slightly relieved. When he had inflated the vest, this tube of compressed gas had automatically begun to release, sending out a foul-smelling vapor that permeated the water for some distance around. The principle was that of the skunk adjusted to the environment of the squid, and dangerous undersea life was supposed to be driven away by the Mellison tubes; but it didn't work with carrion eaters like the snakes. Scott averted his nose. The gadgets were named Mellison tubes, but the men called them Stinkers, a far more appropriate term.

Tides on Venus are unpredictable. The clouded planet has no moon, but it is closer to the Sun than Earth. As a rule the tides are mild, except during volcanic activity, when tidal waves sweep the shores. Scott, keeping a weather eye out for danger, rode the waves in toward the beach, searching the strip of dull blackness for signs of life.

Nothing.

He scrambled out at last, shaking himself like a dog, and instantly changed the clip in his automatic for high explosive. The weapon, of course, was watertight—a necessity on Venus. As Kane sat down with a grunt and deflated his vest, Scott stood eying the wall of jungle thirty feet away. It stopped there abruptly, for nothing could grow on black sand.

The rush and whisper of the waves made the only sound. Most of the trees were liana-like, eking out a precarious existence, as the saying went, by taking in each other's washing. The moment one of them showed signs of solidity, it was immediately assailed by parasitic vines flinging themselves madly upward to reach the filtered sunlight of Venus. The leaves did not begin for thirty feet above the ground; they made a regular roof up there, lying like crazy shingles, and would have shut out all light had they not been of light translucent green. Whitish tendrils crawled like reaching serpents from tree to tree, tentacles of vegetable octopi. There were two types of Venusian fauna: the giants who could crash through the forest, and the supple, small ground-dwellers—insects and reptiles mostly—who depended on poison sacs for self-protection. Neither kind was pleasant company.

There were flying creatures, too, but these lived in the upper strata, among the leaves. And there were ambiguous horrors that lived in the deep mud and the stagnant pools under the forest, but no one knew much about these.

"Well," Scott said, "that's that."

Kane nodded. "I guess I should have checked the motors."

"You wouldn't have found anything. Latent flaws—it would have taken black night to

bring 'em out. Just one of those things. Keep your gas mask handy, now. If we get anywhere near poison flowers and the wind's blowing this way, we're apt to keel over like that." Scott opened a waterproof wallet and took out a strip of sensitized litmus, which he clipped to his wrist. "If this turns blue, that means gas, even if we don't smell it."

"Yes, sir. What now?"

"We-él—the boat's gone. We can't telaudio for help." Scott fingered the blade of his smatchet and slipped it into the belt sheath. "We head for the fort. Eight miles. Two hours, if we can stick to the beach and if we don't run into trouble. More than that if Signal Rock's ahead of us, because we'll have to detour inland in that case." He drew out a collapsible single-lenser telescope and looked southwest along the shore. "Uh-huh. We detour."

A breath of sickening sweetness gusted down from the jungle roof. From above, Scott knew, the forest looked surprisingly lovely. It always reminded him of an antique candlewick spread he had once bought Jeana—immense rainbow flowers scattered over a background of pale green. Even among the flora competition was keen; the plants vied in producing colors and scents that would attract the winged carriers of pollen.

There would always be frontiers, Scott thought. But they might remain unconquered for a long time, here on Venus. The Keeps were enough for the undersea folk; they were self-sustaining. And the Free Companions had no need to carve out empires on the continents. They were fighters, not agrarians. Land hunger was no longer a part of the race. It might come again, but not in the time of the Keeps.

The jungles of Venus held secrets he would never know. Men can conquer lands from the air, but they cannot hold them by that method. It would take a long, slow period of encroachment, during which the forest and all it represented would be driven back, step by painful step—and that belonged to a day to come, a time Scott would not know. The savage world would be tamed. But not now—not yet.

At the moment it was untamed and very dangerous. Scott stripped off his tunic and wrung water from it. His clothing would not dry in this saturated air, despite the winds. His trousers clung to him stickily, clammy coldness in their folds.

"Ready, Kane?"

"Yes, sir."

"Then let's go."

They went southwest, along the beach, at a steady, easy lope that devoured miles. Speed and alertness were necessary in equal proportion. From time to time Scott scanned the sea with his telescope, hoping to sight a vessel. He saw nothing. The ships would be in harbor, readying for the battle; and planes would be grounded for installation of the new telaudio device Cinc Rhys had mentioned.

Signal Rock loomed ahead, an outthrust crag with eroded, unscalable sides towering two hundred feet and more. The black strip of sand ended there. From the rock there was a straight drop into deep water, cut up by a turmoil of currents. It was impossible to take the sea detour; there was nothing else for it but to swerve inland, a dangerous but inevitable course. Scott postponed the plunge as long as possible, till the scarp of Signal Rock, jet black with leprous silvery patches on its surface, barred the way. With a quizzical look at Kane he turned sharply to his right and headed for the jungle.

"Half a mile of forest equals a hundred miles of beach hiking," he remarked.

"That bad, sir? I've never tackled it."

"Nobody does, unless they have to. Keep your eyes open and your gun ready. Don't wade through water, even when you can see bottom. There are some little devils that are pretty nearly transparent—vampire fish. If a few of those fasten on you, you'll need a transfusion in less than a minute. I wish the volcanoes would kick up a racket. The beasties generally lie low when that happens."

Under a tree Scott stopped, seeking a straight, long limb. It took a while to find a suitable one, in that tangle of coiling lianas, but finally he succeeded, using his smatchet blade to hack himself a light five-foot pole. Kane at his heels, he moved on into the gathering gloom.

"We may be stalked," he told the boy. "Don't forget to guard the rear."

The sand had given place to sticky whitish mud that plastered the men to their calves before a few moments had passed. A patina of slickness seemed to overlay the ground. The grass was colored so much like the mud itself that it was practically invisible, except by its added slipperiness. Scott slowly advanced keeping close to the wall of rock on his left where the tangle was not so thick. Neverthe-

less he had to use the smatchet more than once to cut a passage through vines.

He stopped, raising his hand, and the squelch of Kane's feet in the mud paused. Silently Scott pointed. Ahead of them in the cliff base, was the mouth of a burrow.

The captain bent down, found a small stone, and threw it toward the den. He waited, one hand lightly on his gun, ready to see something flash out of that burrow and race toward them. In the utter silence a new sound made itself heard—tiny goblin drums, erratic and resonant in a faraway fashion. Water, dropping from leaf to leaf, in the soaked jungle ceiling above them. *Tink, tink, tink-tink, tink, tink-tink*—

"O. K.," Scott said quietly. "Watch it, though." He went on, gun drawn, till they were level with the mouth of the burrow. "Turn, Kane. Keep your eye on it till I tell you to stop." He gripped the boy's arm and guided him, holstering his own weapon. The pole, till now held between biceps and body, slipped into his hand. He used it to probe the slick surface of the mud ahead. Sinkhole and quicksands were frequent, and so were traps, camouflaged pits built by mud-wolves —which, of course, were not wolves, and belonged to no known genus. On Venus, the fauna had more subdivisions than on old Earth, and lines of demarcation were more subtle.

"All right now."

Kane, sighing with relief, turned his face forward again. "What was it?"

"You never know what may come out of those holes," Scott told him. "They come fast, and they're usually poisonous. So you can't take chances with the critters. Slow down here. I don't like the looks of that patch ahead."

Clearings were unusual in the forest. There was one here, twenty feet wide, slightly saucer-shaped. Scott gingerly extended the pole and probed. A faint ripple shook the white mud, and almost before it had appeared the captain had unholstered his pistol and was blasting shot after shot at the movement.

"Shoot, Kane!" he snapped. "Quick! Shoot at it!"

Kane obeyed, though he had to guess at his target. Mud geysered up, suddenly crimson-stained. Scott, still firing, gripped the boy's arm and ran him back at a breakneck pace.

The echoes died. Once more the distant elfin drums whispered through the green gloom.

"We got it," Scott said, after a pause.

"We did?" the other asked blankly. "What—"

"Mud-wolf, I think. The only way to kill those things is to get 'em before they get out of the mud. They're fast and they die hard. However—" He warily went forward. There was nothing to see. The mud had collapsed into a deeper saucer, but the holes blasted by the high-x bullets had filled in. Here and there were traces of thready crimson.

"Never a dull moment," Scott remarked. His crooked grin eased the tension. Kane chuckled and followed the captain's example in replacing his half-used clip with a full one.

The narrow spine of Signal Rock extended inland for a quarter mile before it became scalable. They reached that point finally, helping each other climb, and finding themselves, at the summit, still well below the leafy ceiling of the trees. The black surface of the rock was painfully hot, stinging their palms as they climbed, and even striking through their shoe soles.

"Halfway point, captain?"

"Yeah. But don't let that cheer you. It doesn't get any better till we hit the beach again. We'll probably need some fever shots when we reach the fort, just in case. Oh-oh. Mask, Kane, quick." Scott lifted his arm. On his wrist the band of litmus had turned blue.

With trained accuracy they donned the respirators. Scott felt a faint stinging on his exposed skin, but that wasn't serious. Still, it would be painful later. He beckoned to Kane, slid down the face of the rock, used the pole to test the mud below, and jumped lightly. He dropped in the sticky whiteness and rolled over hastily, plastering himself from head to foot. Kane did the same. Mud wouldn't neutralize the pioson flowers' gas, but it would absorb most of it before it reached the skin.

Scott headed toward the beach, a grotesque figure. Mud dripped on the eye plate, and he scrubbed it away with a handful of white grass. He used the pole constantly to test the footing ahead.

Nevertheless the mud betrayed him. The pole broke through suddenly, and as Scott automatically threw his weight back, the ground fell away under his feet. He had time

for a crazy feeling of relief that this was quicksand, not a mud-wolf's den, and then the clinging, treacherous stuff had sucked him down knee-deep. He fell back, keeping his grip on the pole and swinging the other end in an arc toward Kane.

The boy seized it in both hands and threw himself flat. His foot hooked over an exposed root. Scott, craning his neck at a painfully awkward angle and trying to see through the mud-smeared vision plates, kept a rattrap grip on his end of the pole, hoping its slickness would not slip through his fingers.

He was drawn down farther, and then Kane's anchorage began to help. The boy tried to pull the pole toward him, hand over hand. Scott shook his head. He was a good deal stronger than Kane, and the latter would need all his strength to keep a tight grip on the pole.

Something stirred in the shadows behind Kane. Scott instinctively let go with one hand, and, with the other, got out his gun. It had a sealed mechanism, so the mud hadn't harmed the firing, and the muzzle had a one-way trap. He fired at the movement behind Kane, heard a muffled tumult, and waited till it had died. The boy, after a startled look behind him, had not stirred.

After that, rescue was comparatively easy. Scott simply climbed along the pole, spreading his weight over the surface of the quicksand. The really tough part was pulling his legs free of that deadly grip. Scott had to rest for five minutes after that.

But he got out. That was the important thing.

Kane pointed inquiringly into the bushes where the creature had been shot, but Scott shook his head. The nature of the beast wasn't a question worth deciding, as long as it was apparently *hors de combat*. Readjusting his mask, Scott turned toward the beach, circling the quicksand, and Kane kept at his heels.

Their luck had changed. They reached the shore with no further difficulty and collapsed on the black sand to rest. Presently Scott used a litmus, saw that the gas had dissipated, and removed his mask. He took a deep breath.

"Thanks, Kane," he said. "You can take a dip now if you want to wash off that mud. But stay close inshore. No, don't strip. There's no time."

The mud clung like glue and the black sand scratched like pumice. Still, Scott felt a good deal cleaner after a few minutes in the surf, while Kane stayed on guard. Slightly refreshed, they resumed the march.

An hour later a convoy plane, testing, sighted them, telaudioed the fort, and a flitterboat came racing out to pick them up. What Scott appreciated most of all was the stiff shot of uisqueplus the pilot gave him.

Yeah. It was a dog's life, all right!

He passed the flask to Kane.

Presently the fort loomed ahead, guarding Doone Harbor. Large as the landlocked bay was, it could scarcely accommodate the fleet. Scott watched the activity visible with an approving eye. The flitterboat rounded the sea wall, built for protection against tidal waves, and shot toward a jetty. Its almost inaudible motor died; the shell swung back.

Scott got out, beckoning to an orderly.

"Yes, sir?"

"See that this soldier gets what he needs. We've been in the jungle."

The man didn't whistle sympathetically, but his mouth pursed. He saluted and helped Kane climb out of the flitterboat. As Scott hurried along the quay, he could hear an outburst of friendly profanity from the men on the dock, gathering around Kane.

He nodded imperceptibly. The boy would make a good Free Companion—always granted that he could stand the gaff under fire. That was the acid test. Discipline was tightened then to the snapping point. If it snapped—well, the human factor always remained a variable, in spite of all the psychologists could do.

He went directly to his quarters, switching on the telaudio to call Cinc Rhys. The cinc's seamed, leathery face resolved itself on the screen.

"Captain Scott reporting for duty, sir."

Rhys looked at him sharply. "What happened?"

"Fitterboat crack-up. Had to make it in here on foot."

The cinc called on his God in a mild voice. "Glad you made it. Any accident?"

"No, sir. The pilot's unharmed, too. I'm ready to take over, after I've cleaned up."

"Better take a rejuvenation—you probably need it. Everything's going like clockwork. You did a good job with Mendez—a better bargain than I'd hoped for. I've been talking with him on the telaudio, integrating our forces. We'll go into that later, though. Clean up and then make general inspection."

"Check, sir."

Rhys clicked off. Scott turned to face his orderly.

"Hello, Briggs. Help me off with these duds. You'll probably have to cut 'em off."

"Glad to see you back, sir. I don't think it'll be necessary to cut—" Blunt fingers flew deftly over zippers and clasps. "You were in the jungle?"

Scott grinned wryly. "Do I look as if I'd been gliding?"

"Not all the way, sir—no."

Briggs was like an old bulldog—one of those men who proved the truth of the saying: "Old soldiers never die; they only fade away." Briggs could have been pensioned off ten years ago, but he hadn't wanted that. There was always a place for old soldiers in the Free Companies, even those who were unskilled. Some became technicians; other military instructors; the rest, orderlies. The forts were their homes. Had they retired to one of the Keeps, they would have died for lack of interests.

Briggs, now—he had never risen above the ranks, and knew nothing of military strategy, ordnance, or anything except plain fighting. But he had been a Dooneman for forty years, twenty-five of them on active service. He was sixty-odd now, his squat figure slightly stooped like an elderly bear, his ugly face masked with scar tissue.

"All right. Start the shower, will you?"

Briggs stumped off, and Scott, stripped of his filthy, sodden garments, followed. He luxuriated under the stinging spray, first hot soapy water, then alcomix, and after that plain water, first hot, then cold. That was the last task he had to do himself. Briggs took over, as Scott relaxed on the slab, dropping lotion into the captain's burning eyes, giving him a deft but murderous rubdown, combining osteopathic and chiropractic treatment, adjusting revitalizing lamps, and measuring a hypo shot to nullify fatigue toxins. When the orderly was finished, Scott was ready to resume his duties with a clear brain and a refreshed body.

Briggs appeared with fresh clothing. "I'll have the old uniform cleaned, sir. No use throwing it away."

"You can't clean that," Scott remarked, slipping into a singlet. "Not after I rolled in mud. But suit yourself. I won't be needing it for long."

The orderly's fingers, buttoning Scott's tunic, stopped briefly and then resumed their motion. "Is that so, sir?"

"Yeah. I'm taking out discharge papers."

"Another Company, sir?"

"Don't get on your high horse," Scott told the orderly. "It's not that. What would you do if it were? Court-martial me yourself and shoot me at sunrise?"

"No, sir. Begging your pardon, sir, I'd just think you were crazy."

"Why I stand you only the Lord knows," Scott remarked. "You're too damn independent. There's no room for new ideas in that plastic skull of yours. You're the quintessence of dogmatism."

Briggs nodded. "Probably, sir. When a man's lived by one set of rules for as long as I have, and those rules work out, I suppose he might get dogmatic."

"Forty years for you—about twelve for me."

"You came up fast, captain. You'll be cinc here yet."

"That's what you think."

"You're next in line after Cinc Rhys."

"But I'll be out of the Doones," Scott pointed out. "Keep that under your belt, Briggs."

The orderly grunted. "Can't see it, sir. If you don't join another Company, where'll you go?"

"Ever heard of the Keeps?"

Briggs permitted himself a respectful snort. "Sure. They're fine for a binge, but—"

"I'm going to live in one. Montana Keep."

"The Keeps were built with men and machines. I helped at the building of Doone fort. Blood's mixed with the plastic here. We had to hold back the jungle while the technicians were working. Eight months, sir, and never a day passed without some sort of attack. And attacks always meant casualties then. We had only breastworks. The ships laid down a barrage, but barrages aren't impassable. That was a fight, captain."

Scott thrust out a leg so that Briggs could lace his boots. "And a damn good one. I know." He looked down at the orderly's baldish, brown head where white hairs straggled.

"You know, but you weren't there, captain. I was. First we dynamited. We cleared a half circle where we could dig in behind breastworks. Behind us were the techs, throwing up a plastic wall as fast as they could. The guns were brought in on barges. Lying offshore were the battlewagons. We could hear

the shells go whistling over our heads—it sounded pretty good, because we knew things were O. K. as long as the barrage kept up. But it couldn't be kept up day and night. The jungle broke through. For months the smell of blood hung here, and that drew the enemy."

"But you held them off."

"Sure, we did. Addison Doone was cinc then—he'd formed the Company years before, but we hadn't a fort. Doone fought with us. Saved my life once, in fact. Anyhow—we got the fort built, or rather the techs did. I won't forget the kick I got out of it when the first big gun blasted off from the wall behind us. There was a lot to do after that, but when that shell was fired, we knew we'd done the job."

Scott nodded. "You feel a proprietary interest in the fort, I guess."

Briggs looked puzzled. "The fort? Why, that doesn't mean much, captain. There are lots of forts. It's something more than that; I don't quite know what it is. It's seeing the fleet out there—breaking in the rookies—giving the old toasts at mess—knowing that—" He stopped, at a loss.

Scott's lips twisted wryly.

"You don't really know, do you, Briggs?"

"Know what, sir?"

"Why you stay here. Why you can't believe I'd quit."

Briggs gave a little shrug. "Well—it's the Doones," he said. "That's all, captain. It's just that."

"And what the devil will it matter, in a few hundred years?"

"I suppose it won't. No, sir. But it isn't our business to think about that. We're Doonemen, that's all."

Scott didn't answer. He could easily have pointed out the fallacy of Briggs' argument, but what was the use? He stood up, the orderly whisking invisible dust off his tunic.

"All set, sir. Shipshape."

"Check, Briggs. Well, I've one more scrap, anyhow. I'll bring you back a souvenir, eh?"

The orderly saluted, grinning. Scott went out, feeling good. Inwardly he was chuckling rather sardonically at the false values he was supposed to take seriously. Of course many men had died when Doone fort had been built. But did that, in itself, make a tradition? What good was the fort? In a few centuries it would have outlived its usefulness. Then it would be a relic of the past. Civilization moved on, and, these days, civilization merely tolerated the military.

So—what was the use? Sentiment needed a valid reason for its existence. The Free Companions fought, bitterly, doggedly, with insane valor, in order to destroy themselves. The ancient motives for war had vanished.

What was the use? All over Venus the lights of the great forts were going out—and, this time, they would never be lit again—not in a thousand lifetimes!

## V.

*And we are here as on a darkling plain*
*Swept with confused alarms of struggle and flight,*
*Where ignorant armies clash by night.*
*—Arnold circa 1870*

The fort was a completely self-contained unit, military rather than social. There was no need for any agrarian development, since a state of complete siege never existed. Food could be brought in from the Keeps by water and air.

But military production was important, and, in the life of the fort, the techs played an important part, from the experimental physicist to the spot welder. There were always replacements to be made, for, in battle, there were always casualties. And it was necessary to keep the weapons up-to-date, continually striving to perfect new ones. But strategy and armament were of equal importance. An outnumbered fleet had been known to conquer a stronger one by the use of practical psychology.

Scott found Commander Bienne at the docks, watching the launching of a new sub. Apparently Bienne hadn't yet got over his anger, for he turned a scowling, somber face to the captain as he saluted.

"Hello, commander," Scott said. "I'm making inspection. Are you free?"

Bienne nodded. "There's not much to do."

"Well—routine. We got that sub finished just in time, eh?"

"Yes." Bienne couldn't repress his pleasure at sight of the trim, sleek vessel beginning to slide down the ways. Scott, too, felt his pulses heighten as the sub slipped into the water, raising a mighty splash, and then settling down to a smooth, steady riding on the waves. He looked out to where the great battlewagons

stood at anchor, twelve of them, gray-green monsters of plated metal. Each of them carried launching equipment for gliders, but the collapsible aircraft were stowed away out of sight as yet. Smaller destroyers lay like lean-flanked wolves among the battleships. There were two fast carriers, loaded with gliders and flitterboats. There were torpedo boats and one low-riding monitor, impregnable, powerfully armed, but slow. Only a direct hit could disable a monitor, but the behemoths had their disadvantages. The battle was usually over before they lumbered into sight. Like all monitors, this one—the *Armageddon*—was constructed on the principle of a razorback hog, covered, except for the firing ports, by a tureen-shaped shield, strongly braced from within. The *Armageddon* was divided into groups of compartments and had several auxiliary engines, so that, unlike the legendary *Rover*, when a monitor died, it did *not* die all over. It was, in effect, a dinosaur. You could blow off the monster's head, and it would continue to fight with talons and lashing tail. Its heavy guns made up in mobility for the giant's unwieldiness—but the trouble was to get the monitor into battle. It was painfully slow.

Scott scowled. "We're fighting over Venus Deep, eh?"

"Yes," Bienne nodded. "That still goes. The Helldivers are already heading toward Montana Keep, and we'll intercept them over the Deep."

"When's zero hour?"

"Midnight tonight."

Scott closed his eyes, visualizing their course on a mental chart. Not so good. When battle was joined near island groups, it was sometimes possible for a monitor to slip up under cover of the islets, but that trick wouldn't work now. Too bad—for the Helldivers were a strong outfit, more so since their recent merger with O'Brien's Legion. Even with the Mob to help, the outcome of the scrap would be anyone's guess. The *Armageddon* might be the decisive factor.

"I wonder—" Scott said. "No. It'd be impossible."

"What?"

"Camouflaging the *Armageddon*. If the Helldivers see the monitor coming, they'll lead the fight away from it, faster than that tub can follow. I was thinking we might get her into the battle without the enemy realizing it."

"She's camouflaged now."

"Paint, that's all. She can be spotted. I had some screwy idea about disguising her as an island or a dead whale."

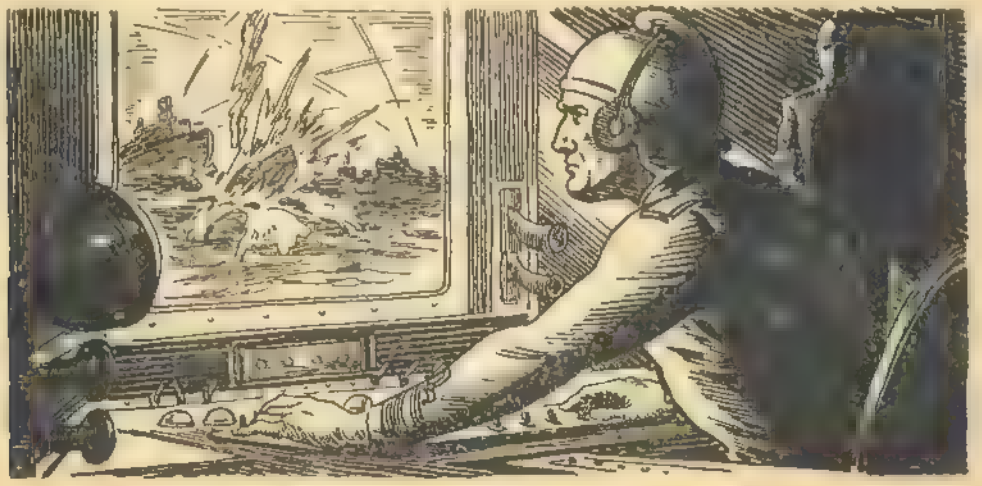
"She's too big for a whale and floating islands look a bit suspicious."

"Yeah. But if we *could* slip the *Armageddon* in without scaring off the enemy—Hm-m-m. Monitors have a habit of turning turtle, don't they?"

"Right. They're top-heavy. But a monitor can't fight upside down. It's not such a bright idea, captain." Briefly Bienne's sunken eyes gleamed with sneering mockery. Scott grunted and turned away.

"All right. Let's take a look around."

The fleet was shipshape. Scott went to the shops. He learned that several new hulls were under way, but would not be completed by zero hour. With Bienne, he continued to the laboratory offices. Nothing new. No



slip-ups; no surprises. The machine was running smoothly.

By the time inspection was completed, Scott had an idea. He told Bienne to carry on and went to find Cinc Rhys. The cinc was in his office, just clicking off the telaudio as Scott appeared.

"That was Mendez," Rhys said. "The Mob's meeting our fleet a hundred miles off the coast. They'll be under our orders, of course. A good man, Mendez, but I don't entirely trust him."

"You're not thinking of a double cross, sir?"

Cinc Rhys made disparaging noises. "Brutus is an honorable man. No, he'll stick to his bargain. But I wouldn't cut cards with Mendez. As a Free Companion, he's trustworthy. Personally— Well, how do things look?"

"Very good, sir. I've an idea about the *Armageddon*."

"I wish I had," Rhys said frankly. "We can't get that damned scow into the battle in any way I can figure out. The Helldivers will see it coming, and lead the fight away."

"I'm thinking of camouflage."

"A monitor's a monitor. It's unmistakable. You can't make it look like anything else."

"With one exception, sir. You can make it look like a disabled monitor."

Rhys sat back, giving Scott a startled glance. "That's interesting. Go on."

"Look here, sir." The captain used a stylo to sketch the outline of a monitor on a convenient pad. "Above the surface, the *Armageddon's* dome-shaped. Below, it's a bit different, chiefly because of the keel. Why can't we put a fake superstructure on the monitor —build a false keel on it, so it'll seem capsized?"

"It's possible."

"Everybody knows a monitor's weak spot —that it turns turtle under fire sometimes. If the Helldivers saw an apparently capsized *Armageddon* drifting toward them, they'd naturally figure the tub was disabled."

"It's crazy," Rhys said. "One of those crazy ideas that might work." He used the local telaudio to issue crisp orders. "Got it? Good. Get the *Armageddon* under way as soon as the equipment's aboard. Alterations will be made at sea. We can't waste time. If we had them made in the yards, she'd never catch up with the fleet."

The cinc broke the connection, his seamed, leathery face twisting into a grin. "I hope it works. We'll see."

He snapped his fingers. "Almost forgot. President Crosby's nephew—Kane?—he was with you when you cracked up, wasn't he? I've been wondering whether I should have waived training for him. How did he show up in the jungle?"

"Quite well," Scott said. "I had my eye on him. He'll make a good soldier."

Rhys looked keenly at the captain. "What about discipline? I felt that was his weak spot."

"I've no complaint to make."

"So. Well, maybe. Starling's outfit is bad training for anyone—especially a raw kid. Speaking of Starling, did Cinc Mendez know anything about his using atomic power?"

"No, sir. If Starling's doing that, he's keeping it plenty quiet."

"We'll investigate after the battle. Can't afford that sort of thing—we don't want another holocaust. It was bad enough to lose Earth. It decimated the race. If it happened again, it'd wipe the race out."

"I don't think there's much danger of that. On Earth, it was the big atomic-power stations that got out of control. At worst, Starling can't have more than hand weapons."

"True. You can't blow up a world with those. But you know the law—no atomic power on Venus."

Scott nodded.

"Well, that's all." Rhys waved him away. "Clear weather."

Which, on this perpetually clouded world, had a tinge of irony.

After mess Scott returned to his quarters, for a smoke and a brief rest. He waved away Briggs' suggestion of a rubdown and sent the orderly to the commissary for fresh tobacco. "Be sure to get Twenty Star," he cautioned. "I don't want that green hydroponic cabbage."

"I know the brand, sir." Briggs looked hurt and departed. Scott settled back in his relaxer, sighing.

Zero hour at twelve. The last zero hour he'd ever know. All through the day he had been conscious that he was fulfilling his duties for the last time.

His mind went back to Montana Keep. He was living again those other-worldly moments in the cloud-wrapped Olympus with Ilene. Curiously, he found it difficult to visualize the girl's features. Perhaps she was a symbol

—her appearance did not matter. Yet she was very lovely.

In a different way from Jeana. Scott glanced at Jeana's picture on the desk, three-dimensional and tinted after life. By pressing a button on the frame, he could have given it sound and motion. He leaned forward and touched the tiny stud. In the depths of the picture the figure of Jeana stirred, smiling. The red lips parted.

Her voice, though soft, was quite natural. "Hello, Brian," the recording said. "Wish I were with you now. Here's a present, darling." The image blew him a kiss, and then faded back to immobility.

Scott sighed again. Jeana was a comfortable sort of person. But— Oh, hell! She wasn't willing to change. Very likely she couldn't. Ilene perhaps was equally dogmatic, but she represented the life of the Keeps—and that was what Scott wanted now.

It was an artificial life Ilene lived, but she was honest about it. She knew its values were false. At least she didn't pretend, like the Free Companions, that there were ideals worth dying for. Scott remembered Briggs. The fact that men had been killed during the building of Doone fort meant a lot to the old orderly. He never asked himself—*why?* Why had they died? Why was Doone fort built in the first place? For war. And war was doomed.

One had to believe in an ideal before devoting one's life to it. One had to feel he was helping the ideal to survive—watering the plant with his blood so eventually it would come to flower. The red flower of Mars had long since blown. How did that old poem go?

> One thing is certain, and the rest is lies;
> The flower that once has blown forever dies.

It was true. But the Free Companions blindly pretended that the flower was still in blazing scarlet bloom, refusing to admit that even the roots were withered and useless, scarcely able now to suck up the blood sacrificed to its hopeless thirst.

New flowers bloomed; new buds opened. But in the Keeps, not in the great doomed forts. It was the winter cycle, and, as the last season's blossoms faded, the buds of the next stirred into life. Life questing and intolerant. Life that fed on the rotting petals of the rose of war.

But the pretense went on, in the coastal forts that guarded the Keeps. Scott made a grimace of distaste. Blind, stupid folly! He was a man first, not a soldier. And man is essentially a hedonist, whether he identifies himself with the race or not.

Scott could not. He was not part of the undersea culture, and he could never be. But he could lose himself in the hedonistic backwash of the Keeps, the froth that always overlies any social unit. With Ilene, he could, at least, seek happiness, without the bitter self-mockery he had known for so long. Mockery at his own emotional weaknesses in which he did not believe.

Ilene was honest. She knew she was damned, because unluckily she had intelligence.

So—Scott thought—they would make a good pair.

Scott looked up as Commander Bienne came into the room. Bienne's sour, mahogany face was flushed deep red under the bronze. His lids were heavy over angry eyes. He swung the door-curtain shut after him and stood rocking on his heels, glowering at Scott.

He called Scott something unprintable.

The captain rose, an icy knot of fury in his stomach. Very softly he said, "You're drunk, Bienne. Get out. Get back to your quarters."

"Sure—you little tinhorn soldier. You like to give orders, don't you? You like to chisel, too. The way you chiseled me out of that left-wing command today. I'm pretty sick of it, Captain Brian Scott."

"Don't be a damned fool! I don't like you personally any more than you like me, but that's got nothing to do with the Company. I recommended you for that command."

"You lie," Bienne said, swaying. "And I hate your guts."

Scott went pale, the scar on his cheek flaming red. Bienne came forward. He wasn't too drunk to co-ordinate. His fist lashed out suddenly and connected agonizingly with Scott's molar.

The captain's reach was less than Bienne's. He ducked inside of the next swing and carefully smashed a blow home on the point of the other's jaw. Bienne was driven back, crashing against the wall and sliding down in a limp heap, his head lolling forward.

Scott, rubbing his knuckles, looked down, considering. Presently he knelt and made a quick examination. A knockout, that was all.

Oh, well.

Briggs appeared, showing no surprise at sight of Bienne's motionless body. The perfect orderly walked across to the table and began to refill the humidor with the tobacco he had brought.

Scott almost chuckled.

"Briggs."

"Yes, sir?"

"Commander Bienne's had a slight accident. He—slipped. Hit his chin on something. He's a bit tight, too. Fix him up, will you?"

"With pleasure, sir." Briggs hoisted Bienne's body across his brawny shoulders.

"Zero hour's at twelve. The commander must be aboard the *Flintlock* by then. And sober. Can do?"

"Certainly, sir," Briggs said, and went out.

Scott returned to his chair, filling his pipe. He should have confined Bienne to his quarters, of course. But—well, this was a personal matter. One could afford to stretch a point, especially since Bienne was a valuable man to have aboard during action. Scott vaguely hoped the commander would get his thick head blown off.

After a time he tapped the dottle from his pipe and went off for a final inspection.

At midnight the fleet hoisted anchor.

By dawn the Doones were nearing the Venus Deep.

The ships of the Mob had already joined them, seven battleships, and assorted cruisers, destroyers, and one carrier. No monitor. The Mob didn't own one—it had capsized two months before, and was still undergoing repairs.

The combined fleets sailed in crescent formation, the left wing, commanded by Scott, composed of his own ship, the *Flintlock*, and the *Arquebus*, the *Arrow*, and the *Misericordia*, all Doone battlewagons. There were two Mob ships with him, the *Navaho* and the *Zuni*, the latter commanded by Cinc Mendez. Scott had one carrier with him, the other being at right wing. Besides these, there were the lighter craft.

In the center were the battleships *Arbalest*, *Lance*, *Gatling*, and *Mace*, as well as three of Mendez's. Cinc Rhys was aboard the *Lance*, controlling operations. The camouflaged monitor *Armageddon* was puffing away valiantly far behind, well out of sight in the mists.

Scott was in his control room, surrounded by telaudio screens and switchboards. Six operators were perched on stools before the controls, ready to jump to action when orders came through their earphones. In the din of battle spoken commands often went unheard, which was why Scott wore a hush-mike strapped to his chest.

His eyes roved over the semicircle of screens before him.

"Any report from the gliders yet?"

"No, sir."

"Get me air-spotting command."

One of the screens flamed to life; a face snapped into view on it.

"Report."

"Nothing yet, captain. Wait." There was a distant thunder. "Detectors clamped on a telaudio tight-beam directly overhead."

"Enemy glider in the clouds?"

"Apparently. It's out of the focus now."

"Try to relocate it."

A lot of good that would do. Motored planes could easily be detected overhead, but a glider was another matter. The only way to spot one was by clamping a detector focus directly on the glider's telaudio beam—worse than a needle in a haystack. Luckily the crates didn't carry bombs.

"Report coming in, sir. One of our gliders."

Another screen showed a face. "Pilot reporting, sir. Located enemy."

"Good. Switch in the telaudio, infra. What sector?"

"V. D. eight hundred seven northwest twenty-one."

Scott said into his hush-mike, "Get Cinc Rhys and Commander Geer on tight-beam. And Cinc Mendez."

Three more screens lit up, showing the faces of the three officers.

"Cut in the pilot."

Somewhere over Venus Deep the glider pilot was arcing his plane through the cloud-layer, the automatic telaudio-camera, lensed to infrared, penetrating the murk and revealing the ocean below. On the screen ships showed, driving forward in battle formation.

Scott recognized and enumerated them mentally. The *Orion*, the *Sirius*, the *Vega*, the *Polaris*—uh-huh. Lighter ships. Plenty of them. The scanner swept on.

Cinc Rhys said, "We're outnumbered badly. Cinc Mendez, are your sub-detectors in operation?"

"They are. Nothing yet."

"We'll join battle in half an hour, I judge.

We've located them, and they've no doubt located us."

"Check."

The screens blanked out. Scott settled back, alertly at ease. Nothing to do now but wait, keeping ready for the unexpected. The *Orion* and the *Vega* were the Helldivers' biggest battleships, larger than anything in the line of the Doones—or the Mob. Cinc Flynn was no doubt aboard the *Orion*. The Helldivers owned a monitor, but it had not showed on the infrared aërial scanner. Probably the behemoth wouldn't even show up in time for the battle.

But even without the monitor, the Helldivers had an overwhelming surface display. Moreover, their undersea fleet was an important factor. The sub-detectors of Cinc Mendez might—probably would—cut down the odds. But possibly not enough.

The *Armageddon*, Scott thought, might be the point of decision, the ultimate argument. And, as yet, the camouflaged monitor was lumbering through the waves far in the wake of the Doones.

Commander Bienne appeared on a screen. He had frozen into a disciplined, trained robot, personal animosities forgotten for the time. Active duty did that to a man.

Scott expected nothing different, however, and his voice was completely impersonal as he acknowledged Bienne's call.

"The flitterboats are ready to go, captain."

"Send them out in fifteen minutes. Relay to left wing, all ships carrying flitters."

"Check."

For a while there was silence. A booming explosion brought Scott to instant alertness. He glanced up at the screens.

A new face appeared. "Helldivers opening up. Testing for range. They must have gliders overhead. We can't spot 'em."

"Get the men under cover. Send up a test barrage. Prepare to return fire. Contact our pilots over the Helldivers."

It was beginning now—the incessant, racking thunder that would continue till the last shot was fired. Scott cut in to Cinc Rhys as the latter signaled.

"Reporting, sir."

"Harry the enemy. We can't do much yet. Change to R-8 formation."

Cinc Mendez said, "We've got three enemy subs. Our detectors are tuned up to high pitch."

"Limit the range so our subs will be outside the sphere of influence."

"Already did that. The enemy's using magnetic depth charges, laying an undersea barrage as they advance."

"I'll talk to the sub command." Rhys cut off. Scott listened to the increasing fury of explosions. He could not yet hear the distinctive *clap-clap* of heat rays, but the quarters were not yet close enough for those undependable, though powerful, weapons. It took time for a heat ray to warm up, and during that period a well-aimed bullet could smash the projector lens.

"Casualty, sir. Direct hit aboard destroyer *Bayonet*."

"Extent of damage?"

"Not disabled. Complete report later."

After a while a glider pilot came in on the beam.

"Shell landed on the *Polaris*, sir."

"Use the scanner."

It showed the Helldivers' battlewagon, part of the superstructure carried away, but obviously still in fighting trim. Scott nodded. Both sides were getting the range now. The hazy clouds still hid each fleet from the other, but they were nearing.

The sound of artillery increased. Problems of trajectory were increased by the violent winds of Venus, but accurate aiming was possible. Scott nodded grimly as a crash shook the *Flintlock*.

They were getting it now. Here, in the brain of the ship, he was as close to the battle as any member of a firing crew. The screens were his eyes.

They had the advantage of being able to use infrared, so that Scott, buried here, could see more than he could have on deck, with his naked eye. Something loomed out of the murk and Scott's breath stopped before he recognized the lines of the Doone battlewagon *Misericordia*. She was off course. The captain used his hush-mike to snap a quick reprimand.

Flitterboats were going out now, speedy hornets that would harry the enemy fleet. In one of them, Scott remembered, was Norman Kane. He thought of Ilene and thrust the thought back, out of his mind. No time for that now.

Battle stations allowed no time for wool gathering.

The distant vanguard of the Helldivers came

into sight on the screens. Cinc Mendez called.

"Eleven more subs. One got through. Seems to be near the *Flintlock*. Drop depth bombs."

Scott nodded and obeyed. Shuddering concussions shook the ship. Presently a report came in: fuel slick to starboard.

Good. A few well-placed torpedoes could do a lot of damage.

The *Flintlock* heeled incessantly under the action of the heavy guns. Heat rays were lancing out. The big ships could not easily avoid the searing blasts that could melt solid metal, but the flitterboats, dancing around like angry insects, sent a rain of bullets at the projectors. But even that took integration. The rays themselves were invisible, and could only be traced from their targets. The camera crews were working overtime, snapping shots of the enemy ships, tracing the rays' points of origin, and telaudioing the information to the flitterboats.

"Helldivers' *Rigel* out of action."

On the screen the big destroyer swung around, bow pointing forward. She was going to ram. Scott snapped orders. The *Flintlock* went hard over, guns pouring death into the doomed *Rigel*.

The ships passed, so close that men on the *Flintlock's* decks could see the destroyer lurching through the haze. Scott judged her course and tried desperately to get Mendez. There was a delay.

"QM—QM—emergency! Get the *Zuni!*"

"Here she answers, sir."

Scott snapped, "Change course. QM. Destroyer *Rigel* bearing down on you."

"Check." The screen blanked. Scott used a scanner. He groaned at the sight. The *Zuni* was swinging fast, but the *Rigel* was too close—too damned close.

She rammed.

Scott said, "Hell." That put the *Zuni* out of action. He reported to Cinc Rhys.

"All right, captain. Continue R-8 formation."

Mendez appeared on a screen. "Captain Scott. We're disabled. I'm coming aboard. Have to direct sub-strafing operations. Can you give me a control board?"

"Yes, sir. Land at Port Sector 7."

Hidden in the mist, the fleets swept on in parallel courses, the big battlewagons keeping steady formation, pouring heat rays and shells across the gap. The lighter ships strayed out of line at times, but the flitterboats swarmed like midges, dog-fighting when they were not harrying the larger craft. Gliders were useless now, at such close quarters.

The thunder crashed and boomed. Shudders rocked the *Flintlock*.

"Hit on Helldivers' *Orion*. Hit on *Sirius*."

"Hit on Mob ship *Apache*."

"Four more enemy subs destroyed."

"Doone sub *X-16* fails to report."

"Helldivers' *Polaris* seems disabled."

"Send out auxiliary flitterboats, units nine and twenty."

Cinc Mendez came in, breathing hard. Scott waved him to an auxiliary control unit seat.

"Hit on *Lance*. Wait a minute. Cinc Rhys a casualty, sir."

Scott froze. "Details."

"One moment— Dead, sir."

"Very well," Scott said after a moment. "I'm assuming command. Pass it along."

He caught a sidelong glance from Mendez. When a Company's cinc was killed, one of two things happened—promotion of a new cinc, or a merger with another Company. In this case Scott was required, by his rank, to assume temporarily the fleet's command. Later, at the Doone fort, there would be a meeting and a final decision.

He scarcely thought of that now. Rhys dead! Tough, unemotional old Rhys, killed in action. Rhys had a free-wife in some Keep, Scott remembered. The Company would pension her. Scott had never seen the woman. Oddly, he wondered what she was like. The question had never occurred to him before.

The screens were flashing. Double duty now—or triple. Scott forgot everything else in directing the battle.

It was like first-stage anæsthesia—it was difficult to judge time. It might have been an hour or six since the battle had started. Or less than an hour, for that matter.

"Destroyer disabled. Cruiser disabled. Three enemy subs out of action—"

It went on, endlessly. At the auxiliaries Mendez was directing sub-strafing operations. Where in hell's the *Armageddon*, Scott thought? The fight would be over before that overgrown tortoise arrived.

Abruptly a screen flashed QM. The lean, beak-nosed face of Cinc Flynn of the Helldivers showed.

"Calling Doone command."

"Acknowledging," Scott said. "Captain Scott, emergency command."

Why was Flynn calling? Enemy fleets in action never communicated, except to surrender.

Flynn said curtly, "You're using atomic power, captain. Explanation, please."

Mendez jerked around. Scott felt a tight band around his stomach.

"Done without my knowledge or approval, of course, Cinc Flynn. My apologies. Details?"

"One of your flitterboats fired an atomic-powered pistol at the *Orion*."

"Damage?"

"One seven-unit gun disabled."

"One of ours, of the same caliber, will be taken out of action immediately. Further details, sir?"

"Use your scanner, captain, on Sector Mobile 18 south *Orion*. Your apology is accepted. The incident will be erased from our records."

Flynn clicked off. Scott used the scanner, catching a Doone flitterboat in its focus. He used the enlarger.

The little boat was fleeing from enemy fire, racing back toward the Doone fleet, heading directly toward the *Flintlock*, Scott saw. Through the transparent shell he saw the bombardier slumped motionless, his head blown half off. The pilot, still gripping an atomic-fire pistol in one hand, was Norman Kane. Blood streaked his boyish, strained face.

So Starling's outfit did have atomic power, then. Kane must have smuggled the weapon out with him when he left. And, in the excitement of battle, he had used it against the enemy.

Scott said coldly, "Gun crews starboard. Flitterboat *Z-19-4*. Blast it."

Almost immediately a shell burst near the little craft. On the screen Kane looked up, startled by his own side firing upon him. Comprehension showed on his face. He swung the flitterboat off course, zigzagging, trying desperately to dodge the barrage.

Scott watched, his lips grimly tight. The flitterboat exploded in a rain of spray and debris.

Automatic court-martial.

After the battle, the Companies would band together and smash Starling's outfit.

Meantime, this was action. Scott returned to his screens, erasing the incident from his mind.

Very gradually, the balance of power was increasing with the Helldivers. Both sides were losing ships, put out of action rather than sunk, and Scott thought more and more often of the monitor *Armageddon*. She could turn the battle now. But she was still far astern.

Scott never felt the explosion that wrecked the control room. His senses blacked out without warning.

He could not have been unconscious for long. When he opened his eyes, he stared up at a shambles. He seemed to be the only man left alive. But it could not have been a direct hit, or he would not have survived either.

He was lying on his back, pinned down by a heavy crossbeam. But no bones were broken. Blind, incredible luck had helped him there. The brunt of the damage had been borne by the operators. They were dead, Scott saw at a glance.

He tried to crawl out from under the beam, but that was impossible. In the thunder of battle his voice could not be heard.

There was a movement across the room, halfway to the door. Cinc Mendez stumbled up and stared around, blinking. Red smeared his plump cheeks.

He saw Scott and stood, rocking back and forth, staring.

Then he put his hand on the butt of his pistol.

Scott could very easily read the other's mind. If the Doone captain died now, the chances were that Mendez could merge with the Doones and assume control. The politico-military balance lay that way.

If Scott lived, it was probable that he would be elected cinc.

It was, therefore, decidedly to Mendez's advantage to kill the prisoned man.

A shadow crossed the doorway. Mendez, his back to the newcomer, did not see Commander Bienne halt on the threshold, scowling at the tableau. Scott knew that Bienne understood the situation as well as he himself did. The commander realized that in a very few moments Mendez would draw his gun and fire.

Scott waited. The cinc's fingers tightened on his gun butt.

Bienne, grinning crookedly, said, "I thought that shell had finished you, sir. Guess it's hard to kill a Dooneman."

Mendez took his hand off the gun, instantly regaining his poise. He turned to Bienne.

"I'm glad you're here, commander. It'll probably take both of us to move that beam."

"Shall we try, sir?"

Between the two of them, they managed to shift the weight off Scott's torso. Briefly the latter's eyes met Bienne's. There was still no friendliness in them, but there was a look of wry self-mockery.

Bienne hadn't saved Scott's life, exactly. It was, rather, a question of being a Doone-man. For Bienne was, first of all, a soldier, and a member of the Free Company.

Scott tested his limbs; they worked.

"How long was I out, commander?"

"Ten minutes, sir. The *Armageddon's* in sight."

"Good. Are the Helldivers veering off?"

Bienne shook his head. "So far they're not suspicious."

Scott grunted and made his way to the door, the others at his heels. Mendez said, "We'll need another control ship."

"All right. The *Arquebus*. Commander, take over here. Cinc Mendez—"

A flitterboat took them to the *Arquebus*, which was still in good fighting trim. The monitor *Armageddon*, Scott saw, was rolling helplessly in the trough of the waves. In accordance with the battle plan, the Doone ships were leading the Helldivers toward the apparently capsized giant. The technicians had done a good job; the false keel looked shockingly convincing.

Aboard the *Arquebus*, Scott took over, giving Mendez the auxiliary control for his substrafers. The cinc beamed at Scott over his shoulder.

"Wait till that monitor opens up, captain."

"Yeah . . . we're in bad shape, though."

Neither man mentioned the incident that was in both their minds. It was tacitly forgotten—the only thing to do now.

Guns were still bellowing. The Helldivers were pouring their fire into the Doone formation, and they were winning. Scott scowled at the screens. If he waited too long, it would be just too bad.

Presently he put a beam on the *Armageddon*. She was in a beautiful position now, midway between two of the Helldivers' largest battleships.

"Unmask. Open fire."

Firing ports opened on the monitor. The sea titan's huge guns snouted into view. Almost simultaneously they blasted, the thunder drowning out the noise of the lighter guns.

"All Doone ships attack," Scott said. "Plan R-7."

This was it. *This was it!*

The Doones raced in to the kill. Blasting, bellowing, shouting, the guns tried to make themselves heard above the roaring of the monitor. They could not succeed, but that savage, invincible onslaught won the battle.

It was nearly impossible to maneuver a monitor into battle formation, but, once that was accomplished, the only thing that could stop the monster was atomic power.

But the Helldivers fought on, trying strategic formation. They could not succeed. The big battlewagons could not get out of range of the *Armageddon's* guns. And that meant—

Cinc Flynn's face showed on the screen.

"Capitulation, sir. Cease firing."

Scott gave orders. The roar of the guns died into humming, incredible silence.

"You gave us a great battle, cinc."

"Thanks. So did you. Your strategy with the monitor was excellent."

So—that was that. Scott felt something go limp inside of him. Flynn's routine words were meaningless; Scott was drained of the vital excitement that had kept him going till now.

The rest was pure formula.

Token depth charges would be dropped over Virginia Keep. They would not harm the Dome, but they were the rule. There would be the ransom, paid always by the Keep which backed the losing side. A supply of korium, or its negotiable equivalent. The Doone treasury would be swelled. Part of the money would go into replacements and new keels. The life of the forts would go on.

Alone at the rail of the *Arquebus*, heading for Virginia Keep, Scott watched slow darkness change the clouds from pearl to gray, and then to invisibility. He was alone in the night. The wash of waves came up to him softly as the *Arquebus* rushed to her destination, three hundred miles away.

Warm yellow lights gleamed from ports behind him, but he did not turn. This, he thought, was like the cloud-wrapped Olympus in Montana Keep, where he had promised Ilene—many things.

Yet there was a difference. In an Olympus a man was like a god, shut away completely from the living world. Here, in the unbroken dark, there was no sense of alienage. Nothing

could be seen—Venus has no moon, and the clouds hid the stars. And the seas are not phosphorescent.

Beneath these waters stand the Keeps, Scott thought. They hold the future. Such battles as were fought today are fought so that the Keeps may not be destroyed.

And men will sacrifice. Men have always sacrificed, for a social organization or a military unit. Man must create his own ideal. "If there had been no God, man would have created Him."

Bienne had sacrificed today, in a queer, twisted way of loyalty to his fetish. Yet Bienne still hated him, Scott knew.

The Doones meant nothing. Their idea was a false one. Yet, because men were faithful to that ideal, civilization would rise again from the guarded Keeps. A civilization that would forget its doomed guardians, the watchers of the seas of Venus, the Free Companions yelling their mad, futile battle cry as they drove on—as this ship was driving—into a night that would have no dawn.

Ilene.

Jeana.

It was no such simple choice. It was, in fact, no real choice at all. For Scott knew, very definitely, that he could never, as long as he lived, believe wholeheartedly in the Free Companions. Always a sardonic devil deep within him would be laughing in bitter self-mockery.

The whisper of the waves drifted up.

It wasn't sensible. It was sentimental, crazy, stupid, slopping thinking.

But Scott knew, now, that he wasn't going back to Ilene.

He was a fool.

But he was a soldier.

THE END.

## PHOTOGRAPHIC PLATE FINDS KEPLER'S NOVA

Check up another triumph of the photographic plate! The fast red-sensitive emulsions now available to astronomers are directly responsible for the rediscovery of Kepler's famous nova of 1604.

Kepler left accurate observations of the nova's position and in modern times astronomers have repeatedly searched this area for traces of the former catastrophe. Invariably they ended in failure. Now it is evident that this was owing to the fact that these searches were either made visually or with ordinary blue-sensitive plates. For a survey just completed with the best red-sensitive emulsions clearly show a small patch of nebulosity within one minute of arc of the best determination of the position of Kepler's Nova. The object is fan-shaped with a filamentary structure. It is quite distinct on the red-sensitive plates, but extremely faint in the blue. The strong emission in the red is attributed to an abundance of glowing hydrogen gas, the same element that produces the scarlet fringe around the Sun during a total eclipse.

From the present brightness of the nebulosity and the magnitude given by Kepler at maximum of —2.5, the range in brightness is estimated to have exceeded twenty magnitudes —strong evidence that it was a super, and not a normal, nova. Also, Kepler's record of the brightness closely follows the customary light curve of one class of supernovae.

The information resulting from the identification of Kepler's Nova now gives astronomers positive assurance that at least three supernovae have appeared within our galaxy within the last nine hundred years: the Crab Nebula or remnant of the supernova of 1054, Tycho's Nova of 1572, and Kepler's Nova of 1604.

R. S. Richardson.

# SHOCK

## By Lewis Padgett

*THE world of the future will be a wonderful place, and the men of the future will be supermen—always perfect. Of course. Naturally. Only—*

Illustrated by M. Isip

When Gregg looked up from his book to see the man crawling through the wall of his apartment, he thought briefly that he was crazy. Such things don't happen to a middle-aged physicist who has arranged his life into an ordered pattern. Nevertheless, there was now a hole in the wall, and a half-naked person with macrocephalia was wedging himself through it.

"Who are you?" Gregg demanded, recovering the use of his tongue.

The man spoke an odd sort of English, slurred and with an extraordinary tonal range, but recognizable. "I'm a mugwump," he announced, balancing on his middle. "My mug's in . . . eh? . . . in 1943 and my wump's in . . . *uh!*" He gave a convulsive wriggle and burst through, sprawling on the carpet and breathing hard. "That was a nardly squeeze. The valve isn't quite big enough yet. Forthever."

It made sense, but not much. Manning Gregg's heavy, leonine features darkened. He reached out, seized a heavy book end, and rose.

"I am Halison," the newcomer announced, adjusting his toga. "This should be 1943. Norvunder soverless."

"What?"

"Semantic difficulty," Halison told him. "I am from about . . . well, several thousand years in the future. Your future."

Gregg's gaze went to the hole in the wall. "You're talking English."

"Learned it in 1970. This isn't my first trip into past. Many of them. Looking for something. Important—skandarly important. I use mental power to warp space-time pharron, so valve opens. Lend me clothes, if you please?"

Still holding the book end, Gregg walked to the wall and looked through the circular gap, just large enough to admit a small man's body. All he could see was a blue, bare wall apparently a few feet away. The adjoining apartment? Improbable.

"Valve will open wider later," Halison said. "Open at night, closed by day. I must be back before Thursday. Ranil-Mens visits me on Thursdays. But now may I beg clothes? There is something I must find— I have been

searching in time for a long carvishtime. Please?"

He was still squatting on the floor. Gregg stared down at his extraordinary visitor. Halison was certainly not Homo sapiens 1943. He had a pinched, bright-pink face, with very large bright eyes, and his cranium was abnormally developed and totally bald. He had six fingers and his toes had fused. And he kept up a continual nervous trembling, as though his metabolism had gone haywire.

"Good Lord!" Gregg said, suddenly understanding. "This isn't a gag. Is it?" His voice rose.

"Gag, gag, gag. Nevishly holander sprae? Was mugwump wrong? Hard to know what to say in new time-world. You have no conception of our advanced culture, sorry. Hard to get down to same plane with you. Civilization moved fast, fast, after your century. There is not much time. Talk later, but important now that you lend me clothes."

There was a cold, hard knot just under Gregg's backbone. "Yes, but—wait. If this isn't some—"

"Forgive me," Halison remarked. "I am looking for something; great hurry. I will return soon. By Thursday anyway to see Ranil-Mens. I get much wisdom from him. Now, forgive reedishly." He touched Gregg's forehead.

The physicist said, "Talk a bit slower, pl—"

Halison was gone.

Gregg whirled, searching the room with his gaze. Nothing. Except that the hole in the wall had doubled in diameter. What the hell.

He looked at the clock. It was just past

eight. It should have been about seven. An hour had passed, it seemed, since Halison had reached out to touch his forehead.

As a sample of hypnotism, it was damned impressive.

Gregg carefully found a cigarette and lit it. Drawing smoke into his lungs, he looked at the valve from across the room and considered. A visitor from the future, eh? Well—

Struck by an obvious thought, he went into the bedroom and discovered that a suit of clothes, a brown Harris tweed, had been confiscated. A shirt was missing, a tie, and a pair of shoes. But the hole in the wall eliminated the chance that this was merely a clever theft. For one thing, Gregg's wallet was still in his trousers pocket.

He looked through the valve again, but still could see nothing but the blue wall. It obviously wasn't in the next-door apartment of Tommy MacPherson, the aging playboy who had given up night-clubbing for more peaceful pursuits, at his doctor's suggestion. Nevertheless, Gregg went into the hall and rang the buzzer beside MacPherson's door.

"'Lo, Mac," he said when a round, pale face, topped by carefully dyed chestnut hair, appeared to blink sleepily at him. "Busy? I'd like to come in a minute."

MacPherson enviously eyed Gregg's cigarette. "Sure. Make yourself at home. I've been going over some incunabula my Philadelphia man sent me, and wishing for a drink. Highball?"

"If you'll join me."

"Wish I could," MacPherson groaned. "But I'm too young to die. What's up?" He followed Gregg into the kitchen and watched the other man carefully examining the wall. "Ants?"

"There's a hole in my wall," Gregg said. "It doesn't come through, though." Which proved that the valve was definitely off the beam. It had to open either into MacPherson's kitchen or else—some other place.

"Hole in your wall? How come?"

"I'll show you."

"I'm not that curious," MacPherson remarked. "Phone the landlord. He may be interested."

Gregg scowled. "I mean it, Mac. I want you to take a look. It's—funny. And I'd rather like confirmation."

"It's either a hole or it isn't," MacPherson said simply. "Is that razor-edged brain of yours poisoned by alcohol? I wish mine was." He looked wistfully at the portable bar.

"You're no help," Gregg said. "But you're better than nobody. Come on!" He lugged the protesting MacPherson into his apartment and pointed to the valve. Mac went over, muttering something about a mirror, and peered into the gap. He whistled softly. Then he put his arm through, stretching it as far as possible, and tried to touch the blue wall. He couldn't quite make it.

"The hole's got bigger," Gregg said quietly, "even since a few minutes ago. You see it too, eh?"

MacPherson found a chair. "Let's have a drink," he grunted. "I need it. Anyhow it's an excuse. Make it short, though," he added with a flash of last-minute caution.

Gregg mixed two highballs and gave MacPherson one. As they drank, he told the other what had happened. Mac was unhelpful.

"Out of the future? Glad it didn't happen to me. I'd have gone off my crock."

"It's perfectly logical," Gregg argued, partly with himself. "The guy—Halison—certainly wasn't a 1948 product."

"He must have looked like a combination of Baby Sandy and Karloff."

"Well, you don't look like a Neanderthaler or a Piltdown man, do you? That skull of his—Halison must have a tremendous brain. His I. Q.—well!"

"What good's all that if he wouldn't talk to you?" MacPherson asked cogently.

For some reason Gregg felt a slow flush creeping warmly up his neck. "I must have seemed like an ape to him," he said flatly. "I could scarcely understand him—and no wonder. But he'll be back."

"By Thursday? Who's this Ranilpants?"

"Ranil-Mens," Gregg said. "A friend, I suppose. A . . . a teacher. Halison said he got wisdom from him. Perhaps Ranil-Mens is a professor at some future university. I can't quite think straight. You don't realize the implications of all this, Mac, do you?"

"I don't want to," MacPherson said, tasting his drink. "I'm a bit scared."

"Rationalize it away," Gregg advised. "I'm going to." He looked again at the wall. "That hole's getting pretty big. Wonder if I could step through it?" He walked close to the valve. The blue wall was still there, and a blue floor at a slightly lower level than his own gray carpet. A pungent, pleasant

breath of air floated in from the unknown, oddly reassuring.

"Better not," MacPherson said. "It might close up on you."

For answer Gregg vanished into the kitchen and returned with a length of thin clothesline. He made a loop around his waist, handed the other end to MacPherson, and crushed out his cigarette in a convenient tray.

"It won't close till Halison gets back. Or anyway it won't close too fast. I hope. Sing out if you see it starting to shut, though, Mac. I'll come diving back headfirst."

"Crazy fool," MacPherson said.

Gregg, rather pale around the lips, stepped into the future. The valve was more than four feet in diameter by now, its lower edge two feet from the carpet. Gregg had to duck. He straightened up, remembering to breathe, and looked back through the hole into MacPherson's white face.

"It's O. K.," he said.

"What's over there?"

Gregg flattened himself against the blue wall. The floor felt soft under his feet. The four-foot circle was like a cut-out disk, an easel set up in empty air, a film process shot. He could see MacPherson there, and his own room.

But he was in another room now, large, lit with a cool radiant glow, and utterly different from anything he had ever seen before.

The windows drew his attention first, oval, tall openings in two of the blue walls, transparent in the center, and fading around the edges to translucence and then azure opaqueness. Through them he glimpsed lights, colored lights that moved. He took a step forward and hesitated, looking back to where MacPherson waited.

"What's it like?"

"I'll see," Gregg said, and circled the valve. It was invisible from the other side. Perhaps light rays were bent around it. He couldn't tell. A little frightened, he returned briefly to glimpse MacPherson again, and, relieved, continued his explorations.

The room was about thirty feet square, with a high-domed roof, and the lighting source was at first difficult to discover. Everything in the room had a slight glow. Absorption of sunlight, Gregg thought, like luminous paint. It seemed effective.

There wasn't much to see. There were low couches, functional-looking padded chairs, comfortable and pastel-tinted, and a few rubbery tables. A square glassy block as large as a small overnight bag, rubbery in texture, was on the blue floor. Gregg could not make out its purpose. When he picked it up gingerly, colors played phosphorescently for a few moments within it.

There was a book on one of the tables, and he pouched this for future reference. MacPherson hailed him.

"Manning? O. K. in there?"

"Yeah. Just a minute."

Where were the doors? Gregg grinned wryly. He was slightly handicapped by lacking even the basic technological knowledge for this unknown world. The doors might be activated by pressure, light, or sound. Or even odor, for all he knew. A brief inspection could tell him nothing. But he was worried about the valve. If it closed—

Well, no great harm would be done, Gregg supposed. This future world was peopled by humans sufficiently similar to himself. And they'd have enough intelligence to return him to his own time-sector—Halison's appearance proved that. Nevertheless, Gregg preferred to have an open exit.

He went to the nearest window and looked out. The constellations in the purple sky had changed slightly, not much in a few thousand years. The rainbow lights darted here and there. Aircraft. Beneath him, the dark masses of buildings were dimly visible in the shadow. There was no moon. A few towers rose to his own height, and he could make out the rounded silhouettes of their summits.

One of the lights swept toward him. Before Gregg could draw back he glimpsed a small ship—antigravity, he thought—with a boy and a girl in the open cockpit. There was neither propeller nor wing structure. The pair resembled Halison in their large craniums and pinched faces, though both had hair on their heads. They, too, wore togalike garments.

And they did not seem strange, somehow. There was no—alienage. The girl was laughing, and, despite her bulging forehead and meager features, Gregg thought her strangely attractive. Certainly there was no harm in these people. The vague fears of a coldly, ruthlessly inhuman super-race went glimmering.

They glided past, not twenty feet away, looking straight at Gregg—and did not see him. Astonished, the physicist reached out to touch the smooth, slightly warmish surface of the pane. Odd!

But there were no lights in the other buildings. The windows must be one-way only, to insure privacy. You could see out, but not in.

"Manning!"

Gregg turned hurriedly, recoiling the rope as he returned to the valve. MacPherson's worried frown greeted him.

"I wish you'd come back. I'm getting jittery."

"All right," Gregg said amiably, and crawled through the hole. "But there's no danger. I bagged a book. Here's some incunabula for you!" He drew the volume from his pocket.

MacPherson took it but didn't open it immediately. His pale eyes were on Gregg's.

"What did you find?"

Gregg went into detail. "Quite remarkable in its suggestions, you know. A tiny slice out of the future. It didn't seem so strange when I was *in* there, but now it seems funny. My drink's warm. Another?"

"No. Oh, well—yes. Short."

MacPherson examined the book while Gregg went into the kitchen. Once he glanced up at the valve. It was a little larger, he thought. Not much. Perhaps it had nearly reached its maximum.

Gregg came back. "Can you read it? No? Well, I expected that. Halison said he had to learn our language. I wonder what he's looking for—in his past?"

"I wonder who Ranil-Mens is."

"I'd like to meet him. Thank Heaven I've got a high I. Q. If I can get Halison—or somebody—to explain things to me, I ought to be able to grasp the rudiments of future technology. What a chance, Mac!"

"If he's willing."

"You didn't meet him," Gregg said. "He was friendly, even though he did hypnotize me. What's that?" He seized the book to examine a picture.

"Octopus," MacPherson suggested.

"Chart. I wonder. It looks almost like an atomic structure, but it's no compound I've ever run into. I wish I could read these infernal wiggles. They look like a combination of Burmese and Pitman. Even the numerical system's different from the Arabic. A whole treasure chest out there, and no key!"

"Hm-m-m. Could be. It still looks a bit dangerous to me."

Gregg eyed MacPherson. "I don't think so. There's no reason at all for anticipating trouble. Dime-novel stuff."

"What is life but a dime novel?" MacPherson asked moodily, rather bottle-dizzy from the unaccustomed liquor.

"That's your way of looking at it. And the way you live it." Gregg's tone was unpleasant, chiefly because he was allergic to MacPherson's casually hopeless philosophy. "Try being logical for a change. The race is advancing, in spite of dictators and professional reformers. The industrial revolution started speeding up social mutations. Natural mutations tie in with that. It's progressive. In the next five hundred years we'll have covered as much ground as we did in the last ten thousand. A snowball rolling downhill."

"So what?"

"So the ultimate result is logic," Gregg said, "and that doesn't mean a cold-blooded inhuman logic, either. Not when it's human logic. It takes emotions and psychology into account. It will, that is. There won't be Great Brains wanting to conquer universes, or enslaving the remnants of humans. We've seen that. Halison—he was willing to talk, but in too much of a hurry just then. He said he'd explain later."

"All I know is that there's a hole in the wall," MacPherson said. "It's one of those things that doesn't happen. Now it's happened. Sorry I've got my wind up."

"That's the way you're keeping your emotional balance," Gregg told him. "I prefer to do it along the lines of mathematics. Working out the equation, from what factors we've got. Induction won't tell us much, but it shows what a tremendous thing the whole must be. A perfect world—"

"How d'you know?"

Gregg was stumped. "Well, it seemed that way. In a few thousand years civilization will have time to apply technology and use the nuances. Physically and mentally. The best part of it is that they won't be snooty about it. They *can't*. Anyhow, Halison wasn't."

"That hole isn't getting any bigger," MacPherson said. "I've been watching a spot on the wallpaper."

"Well," Gregg said inconclusively, "it's not getting smaller, either. Wish I knew how to open the doors in there. So damn much I can't understand by myself!"

"Have another drink. That may help."

It didn't, much. Gregg didn't quite dare go through the valve again, for fear it might close suddenly, and he sat with MacPherson,

smoking, drinking, and talking, while the night moved slowly on. From time to time they re-examined the book. That told them nothing.

Halison remained absent. At three a. m., the valve began closing. Gregg remembered what the man from the future had said; that the gap would open at night and remain closed by day. Presumably it would open again. If it didn't, then the chance of a hundred lifetimes had been muffed!

In half an hour the valve had shut completely, leaving no trace on the wallpaper. MacPherson, glassy about the eyes, returned to his own apartment. Gregg locked the book in a desk drawer and went to bed to snatch a few hours' sleep before the alarm roused him.

Later, dressing, Gregg phoned Haverhill Research to say he would not be in that day. In case Halison showed up, he wanted to be on hand. But Halison did not arrive. Gregg spent the morning crushing out cigarettes and thumbing through the book. In the afternoon he sent it by messenger to Courtney, at the university, with a brief note asking for information. Courtney, whose forte was languages, telephoned to say he was baffled.

Naturally he was curious. Gregg spent an awkward five minutes putting him off, and decided to be more wary next time. He was not anxious to release his secret to the world. Even MacPherson—well, that couldn't be helped now. But this was Manning Gregg's discovery, and it was only fair that he should have first rights.

Gregg's selfishness was completely unmercenary. Had he analyzed his motives, he would have realized that he was greedy for intellectual intoxication—that was the only suitable term. Gregg did have a really fine, keen-edged brain, and took an intense delight in using it. He could get positively drunk on the working out of technical problems, the same pleasure an engineer feels at sight of a beautifully executed blueprint, or a pianist confronted by an intricate composition. He was a perfectionist. And to be given a key to the perfect world of the future—

He was not certain of its perfection, of course, but later he felt more certain. Especially after the valve slowly began opening at 6:30 p. m. that evening.

This time Gregg went through as soon as the hole was large enough to admit him. He had plenty of time. His search for a door proved fruitless, but he did make another discovery—the blue walls were in reality the doors of immense cupboards, full of extraordinary objects. Books, of course—though he could read none of them. Some of the charts were tantalizingly on the edge of translation into his own focus of understanding, but not quite. Pictures, three-dimensional and tinted, proved fascinating in their dim glimpses of the life of the future. It was, he suspected, a happy sort of life.

The cupboards—

They held the *damnedest* things. No doubt they were all perfectly familiar to Halison, but what, for example, could Gregg make of a two-foot doll, modeled after a future human, that recited what seemed to be poetry in an unknown tongue? The rhyme scheme was remarkable, from what Gregg could understand of it—an intricate, bizarre counterpoint that had a definite emotional effect, even in the alien language.

And then there were more of the rubbery, glassy blocks, with moving lights inside; and metallic frameworks—one of which Gregg recognized as a model of the solar system; and a hydroponic garden with chameleon qualities; and plastics of possibly mythical animals that could be merged to produce other animals that were crosses or sports—an incredible demonstration of pure genetics, this; and more, and more, and *more!* Gregg got dizzy. He had to go to the windows to recuperate.

The rainbow lights still flashed through the dark. Far below he could make out intermittent blazes of radiance, as though star shells were bursting. For a shocked instant he thought of war. Another glow, fountaining up, relieved him; by craning his neck, he could see tiny figures posturing and dancing in mid-air in a tumultuous sea of color, perhaps a ballet without gravity. No, this was the perfect world.

He was, suddenly, overcome by an intense desire to emerge from this silent room into that blazing, joyous tumult outside. But he could find no way of opening the windows. And the springs that controlled the doors still eluded him. It had not been easy to discover the concealed buttons that operated the cupboards, Gregg remembered.

He thought, with grim amusement, of old Duffey at the Haverhill, and how the man would react to sight of all this. Well, the devil with Duffey. Later, the world could drink, but he wanted—and deserved—the first ec-

static sip from this bottle of vintage wine.

He hoped someone would come into Halison's apartment, perhaps Ranil-Mens. There might be some semantic difficulties at first, unless the visitor had troubled to learn archaic English—which wasn't likely—but these wouldn't be insurmountable. If only Ranil-Mens *would* appear, to point out how the gadgets in the cupboards worked! A fine spot for a physicist!

Nobody appeared, however, and, bearing booty, Gregg returned to his own time-sector, finding MacPherson sprawled in a chair drinking highballs and eying the valve skeptically.

"How'd you get in?" Gregg demanded.

"Walked in," MacPherson said. "The door was open. Halison was standing inside, so I stopped to see what was up. He's real, all right." Ice cubes clinked.

"Halison here? Mac, what—"

"Take it easy. I came in and asked him who he was. 'Halison,' he said. 'I just dropped in for a minute'—or words to the effect. 'Gregg wants to see you,' I said. 'Haven't time yet,' he says. 'I'm looking for something. I'll be back by Thursday to see Ranil-Mens. I'll tell Gregg anything he wants to know then. I *can* tell him plenty, too—I'm labeled as a genius.' All this was in a sort of double talk, but I managed to understand it. After that he went out. I ran after him. 'Where's Gregg?' I yelled. He waved back toward the . . . the valve, and scooted off downstairs. I stuck my head through the hole in the wall, saw you, and started to feel funny. So I fixed a highball and sat down to wait. That guy gives me the creeps."

Gregg dropped his burden on a couch. "Damn! So I missed him. Well, he'll be back, that's one consolation. Why the devil does he give you the creeps?"

"He's different," MacPherson said simply.

"Nothing human is alien. Don't tell me he's not human."

"Oh, he's human, all right, but it isn't our sort of humanity. Even his eyes. He looks right through you, as though he's seeing into the fourth dimension."

"Maybe he does," Gregg speculated. "I wish . . . *mph*. He'll tell me anything I want to know, eh? I'll have a drink on that. What a chance! And he's a genius, even for his age. I suppose it'd take a genius to work out that space-time business."

MacPherson said quietly, "It's his world, Manning, not yours. If I were you, I'd stay out of it."

Gregg laughed, his eyes very bright. "Under other circumstances, I'd agree. But I know something about that world now. The pictures in the books, for example. It *is* a perfect world. Only just now it's a world beyond my comprehension. Those people have gone far beyond us in everything, Mac. I doubt if we're capable of understanding everything there. Still, I'm not exactly a moron. I'll learn. My training will help. I'm a technician *and* a physicist."

"All right. Suit yourself. I'm drunk now because I've been sitting looking at that hole in the wall and wondering if it'd snap shut forever."

"Nuts," Gregg said.

MacPherson got up, weaving on his feet. "I'm going to bed. Call me if you need me for anything. G'night."

"Night, Mac. Oh, say. You haven't mentioned this to anyone, have you?"

"No. I won't. And Halison's eyes scared me, even though they had a friendly look in them. Man and superman. *Urp!*" MacPherson floated away in a haze of Scotch mist. Gregg chuckled and closed the door carefully.

Whatever else he might be, Halison was no superman. He hadn't evolved to that extreme, or, obviously, there could have been no meeting ground between the two—Homo sapiens and Homo superior. There was much that was mysterious about the man from the future—his enigmatic quest through time, for example—but by Thursday, Gregg hoped, he'd know at least some of the answers. If he could only curb his impatience till then.

He didn't go to work the next day, either. That was Wednesday. He spent his time pondering over the gadgets he had brought back from the future, finding a cold sort of comfort in that.

He waited till hunger pangs could no longer be ignored, and then decided to step around the corner for a sandwich. On second thought, he changed his mind and ate across the street, at a fly-blown quick-lunch joint, where he could keep his eye on the apartment house.

He saw Halison go in.

Choking on a mouthful, Gregg flung a handful of change at the waiter and dashed out. On the steps he nearly stumbled and caught himself by clutching wildly at the surprised doorman. The elevator—

Gregg cursed its slowness. His apartment door was open. Halison was emerging.

"Tawnishly hello," Halison said. "I returned for a clean shirt."

"Wait," Gregg said desperately. "I want to talk to you."

"No time yet. I'm still searching marj entar—haven't found—"

"Halison! When will you talk to me?"

"Wednesday night. Tomorrow. I must be back then to see Ranil-Mens Thursday. Who is wiser than I, by the way."

"The valve won't shut permanently?"

"Sar no. Not till the mental power runs down. That will not be for zanentho nearly two weeks yet."

"I was afraid I might be caught on the other side—"

"The serving robots bring food by day; you would not go hungry. You could return the next night when the valve opened maronail again. No danger. None in my world harms another. To help and heal for commonweal—a bad translation. Your language—stinks sarkoment."

"But—"

Halison flicked away like a phantom and was gone down the stairs. Gregg started after him, but was easily outdistanced. Glumly he returned to his apartment. Tomorrow night, however—

Tomorrow night!

Well, he could afford the time for a genuine dinner now, at any rate. Comforted by the thought, Gregg went to his favorite restaurant and ate veal scallopini. After that, he forgathered with MacPherson and relayed his conversation with Halison. MacPherson was not cheerful.

"None in his world harms another," Gregg quoted.

"All the same—I don't know. I'm still scared."

"I'm going through again and see what I can pick up."

He did. He didn't wait till the valve was large enough, and went through headfirst, crashing back from the wall and thumping his head against a table. Since it was satisfactorily resilient, that didn't matter. The future has its conveniences.

That night was a repetition of the preceding one. Gregg's curiosity rose to burning pitch. All about him lay the secrets of a culture far beyond his own—and the key was just beyond his fingertips. It was difficult to wait now.

But he had to wait. He still hadn't fathomed the secret of the door, and he'd forgotten to ask Halison about it. If a telephone or televisor existed, it was hidden in some secret nook he couldn't locate. Oh, well.

Wednesday Gregg went to work, but was home early, chafing. MacPherson dropped in briefly. Gregg discouraged him. He wanted no three-way conversation. He began outlining on paper the questions he meant to ask Halison.

At six forty-five the valve began to open.

At midnight Gregg was biting his nails.

At two he woke MacPherson and begged the man to have a drink with him.

"He's forgotten," Gregg said tonelessly, lighting a cigarette and crushing it out. "Or something. Damn!"

"There's plenty of time," MacPherson grunted. "Take it easy. I only hope he doesn't show up."

They waited a long time. The valve began to close slowly. Gregg cursed in a heartfelt monotone. The telephone rang.

Gregg answered, talked briefly, and cradled the receiver. His face was strained as he turned to MacPherson.

"Halison's been killed. A truck hit him. They found one of my cards in the pocket of his suit."

"How d'you know it's Halison?"

"They described him. Mac, what a chance! And that so-and-so has to go and walk in front of a truck. Blast him to—"

"Ways of Providence," MacPherson said, *sotto voce*, but Gregg heard him.

"There's still Ranil-Mens."

"Whoever he is."

"Some friend of Halison, of course!" Gregg's tone was knife-edged. "He'll visit Halison's apartment tomorrow—Thursday. The first possible contact with that world, Mac. I've only been there at night. And I couldn't get out of the room—couldn't locate the doors. But if I'm there tomorrow when Ranil-Mens comes—"

"What if the valve doesn't open again?"

"Halison said it would. That's logical enough. Mental energy, like any other, has to drain away gradually unless it's cut off. And Halison's death certainly didn't cut it off." Gregg nodded toward the slowly closing valve.

"In the words of the prophet," MacPherson said, "don't." He went out and made himself a drink. Most of that drink was straight Scotch. A cold, sick fear was crawling up MacPherson's spine.

They talked inconclusively for a while. In the end, Gregg went through. His face showed through the hole like a portrait in a circular frame.

"So far, so good," he announced. "I'll see you tomorrow, Mac. And I'll have plenty to tell you."

MacPherson's nails dug into his palms. "Want to change your mind? I wish—"

Gregg grinned. "No chance. I'm the boy that's going to get the answers this time. Get it through your thick skull, Mac, there's no danger."

"O. K."

"Hand me a drink. There's no liquor on this side . . . thanks. Luck!"

"Luck," MacPherson said. He sat waiting. The valve shrank.

"It'll be too late in a minute, Manning."

"It's too late now. See you later, son. Six thirty tomorrow. And maybe I'll bring Ranil-Mens with me."

Gregg lifted the glass. The valve slowly shrank to dime-size. And vanished.

MacPherson didn't move. He sat there, waiting. He was afraid, coldly and definitely and unarguably, though, of course, illogically.

And then, without turning, he sensed the presence of someone in the room.

Halison walked into his range of vision. "Too savishly late," he said. "Well, tomorrow night will do. Though I am sorry to have missed Ranil-Mens."

The fumes of alcohol seemed to whirlwind in MacPherson's skull. "The truck," he said. "The truck. The accident—"

Halison shrugged. "My metabolism is dif-

ferent. Catalepsy is frequent to me. The nervous shock threw me into that septol state. I woke in the . . . what? . . . morgue, explained a little of what had happened, came here. But too late. I have not yet found what I have been searching for."

"Just what have you been searching for?" MacPherson asked.

"I am looking for Halison," Halison said, "because he has been lost in the past, and Halison will not be whole again till I find him. A genius must be whole. I worked hard, hard, and one day Halison slipped away and was gone in the past. So I must search."

MacPherson turned into ice, realizing what the look in Halison's eyes meant.

"Ranil-Mens," he said. "Then . . . oh, my God!"

Halison put out a groping, six-fingered hand. "Mordishly. You know what they said. But they were wrong. I was isolated, to heal. That was wrong, too, but it gave me time to open the door to the past and look for Halison where Halison is lost. The robot servants gave me food and I had quiet, which I zeverti needed. But the toys they placed in my room I did not need and did not use often."

"Toys—"

"San, san, san. Farlingly oculltar—but the words change. Even for a genius the way is hard. I am not what they said. Ranil-Mens understood. Ranil-Mens is a robot. All our physicians are robots, trained to do their tasks perfectly. But it was hard at first. The treatment—san, san, san, dantro. It took a strong brain to withstand the healing that Ranil-Mens gave me weekly. Even for me, a genius, it was—san, san, san, and they go far into whirling down forever bytoken—"

MacPherson said, "What was it? What was it, damn you?"

"No," Halison said, crouching suddenly on the carpet and covering his face with his hands. "Fintharingly and no, no—"

MacPherson leaned forward, the glass slipping from his sweating hand. "What—"

Halison lifted a blind bright stare. "The shock treatment for insanity," he said. "The new, the terrible, the long and long and eternal long healing that Ranil-Mens brings me once a week, but I do not mind it now, and I like it, and Ranil-Mens will give it to Gregg instead of to me, san, san, san and whirling—"

The pattern had fallen into place. The padded furniture, the lack of doors, the windows that did not open, the toys.

A cell in a madhouse.

To help and heal.

Shock treatment.

Halison got up and went to the open door. "Halison—" he said.

His footsteps died away along the hall. His voice came back gently.

"Halison is in the past. San, san, san, and I must find Halison so Halison will be whole again, Halison, san, san, san—"

The first rays of Thursday's sun struck through the windows.

THE END.

# THE ANALYTICAL LABORATORY

What with Christmas and New Year's holidays, everybody seems to have been pretty busy doing other things—too busy to write many letters voting on stories. A light vote—decidedly—makes the score on the January issue less accurate than the figures seem to indicate. Particularly so since there was a great difference of opinion among those who did write. Nearly every story got votes ranging from first-class to stinkeroo. But the score stands now, as follows:

| Place. | Story. | Author. | Points. |
|---|---|---|---|
| 1. | Opposites—React | Will Stewart | 2.45 |
| 2. | Tied between: | | |
| | The Search and Barrius, Imp. | A. E. van Vogt<br>Malcolm Jameson | 3.37<br>3.37 |
| 3. | The Cave | P. Schuyler Miller | 3.42 |
| 4. | Time Locker | Lewis Padgett | 3.71 |
| 5. | Elsewhen | Anthony Boucher | 3.75 |

Apparently, you can take your pick of the order of preference; with scores as close as those, and a light vote—even lighter for "Opposites—React," since many waited for the second part—it's practically a six-way tie.

THE EDITOR.

# SHADOW OF LIFE

## By Clifford D. Simak

***THE** Ghost had a function. The Preachers had a function. And each served a race that had vanished, hidden away somewhere in fear of the evil life of the Galaxy. That, they said, was the only way—*

Illustrated by Kramer

The thing at the control board tittered in sardonic mockery.

"Your creeds are all in error," it said. "There is nothing but evil."

Stephen Lathrop said wearily: "I've seen enough."

"I've tried to show you the human race is something that never should have been," declared the thing. "Maybe an experiment that went sour. By some queer quirk it took the wrong step, followed the wrong path. It became benevolent. There is no room for benevolence in the Universe. It's not the accepted way of life. I think I've proven that."

"Why did you bother?" Lathrop demanded.

The thing regarded him with fishy eyes. "There was another race. A race that found the answer—"

"We'll find ours, too," growled the human being. "By the time they reach us we'll have the answer. We'll fight them in our own way."

"You can't fight them," said the thing. "There is no way to fight universal evil. The best you can do is hide from it."

The Earthman shrugged. "None of them will reach us for a long time. Now that we know about them, we'll be ready."

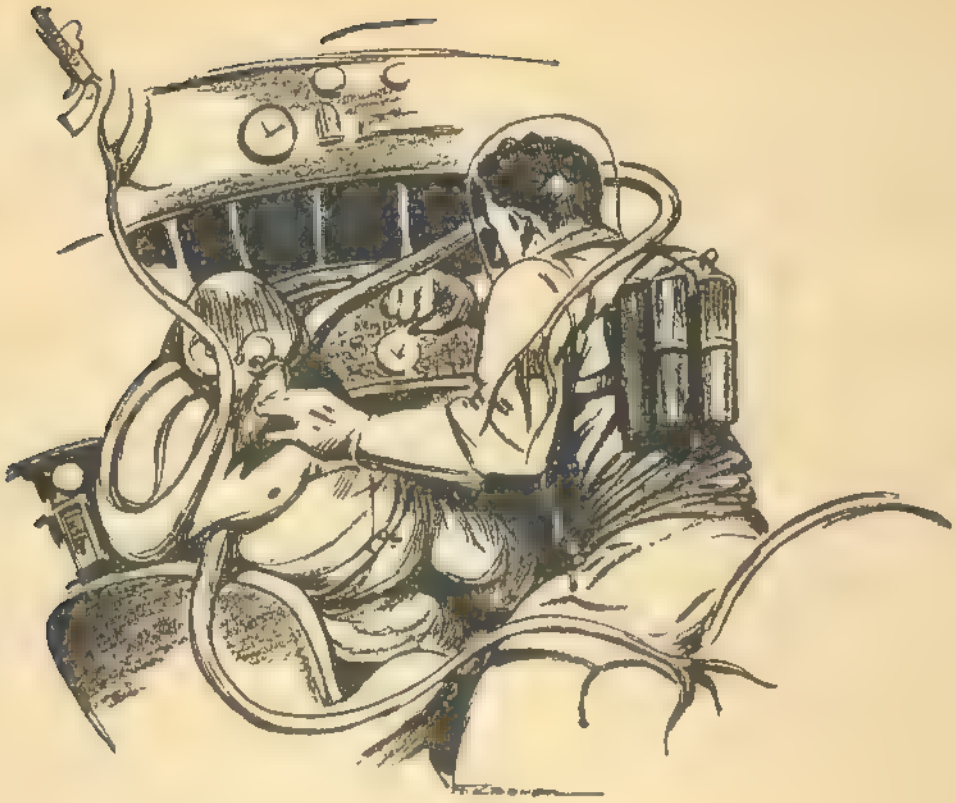
The thing at the controls concentrated on the setting of more studs, then said: "You'll never be ready. You're like a candle in the wind, waiting for a gust that will puff you out."

Through the vision plates Lathrop could see the harsh blackness of space, dotted here and there with unfamiliar stars, dusted with faint mists that were distant galaxies.

Somewhere, far back toward the center of the Universe, millions of light-years from where they cruised, lay the Milky Way, home galaxy of the planets that circled Helios.

Lathrop tried to think back the way they'd come, tried to think back to green Earth and red Mars, but time blurred the road of thought and other memories encroached, cold, fear-etched memories that reached for him like taloned, withered claws.

Memories of alien lands acrawl with loathesomeness and venom. Strange planets that were strange not because they were alien, but



because of the abysmal terror in the very souls of them. Memories of shambling things that triumphed over pitiful peoples whose only crime was they could not fight back.

He shook his head, as if to shake the memories away, but they wouldn't go. He knew they would never go. They would always walk with him, would wake him screaming from his sleep.

They stayed now, those memories, and shrieked at him—rolling, clanging phrases that bit into his brain. Thundering the soul-searing saga of the elder evil that squatted on the outer worlds. Evil on the move, gobbling up the galaxies, marching down the star streams. Unnatural hungers driving sickening hordes across the gulfs of space to raven and to plunder.

Everything the human race held close, he knew, were alien traits to these races he had seen—not alien in the sense they were not recognized, but more terribly alien in that they could not be recognized. There was simply no place in the make-up of those hordes for the decency and love and loyalty that lay inherent in the people of the Earth. The creeds of Earth could never be their creeds—they could no more understand the attitude of the Earthman than the Earthman could understand their sense of rightness in total evil.

"I don't thank you for what you've done," Stephen Lathrop told the thing.

"I don't expect your thanks," the creature replied. "I've shown you the Universe, a cross section of it, enough so you can see what is in store for the human race."

"I didn't ask to see it," Lathrop said. "I didn't want to see it."

"Of course you didn't," said the thing.

"Why did you take me then?"

"The Earth must know," the thing declared. "The Earth must prepare for the day when this tide of evil moves into its planets."

"And I'm to tell them about it," Lathrop said bitterly. "I'm to become one of the Preachers. One of the Preachers of Evil. I'm to stand on soap boxes on the street corners of Earth. I'm to tramp the sands of Mars to bring the message. I'll be damned if I will do it."

"It would be a service to your race."

"A service to tell them they have to run and hide?" asked Lathrop. "You don't understand the human race. It doesn't hide. It just gets sore and wants to fight. And even if it did want to hide, where would it go?"

"There is a way," the thing persisted.

"Another one of your riddles," Lathrop said. "Trying to drive me mad with the things you hint at. I've gotten along with you. I've even tried to be friendly with you. But I've never reached you, never felt that as two living things we had anything in common. And that isn't right. Just the bare fact we are alive and alone should give us some sense of fellowship."

"You talk of things for which I have no word," the thing declared. "You have so many thoughts that are alien to me."

"Perhaps you understand hatred then?"

"Hatred," it said, "is a thing I know about."

Lathrop watched the creature narrowly as it labored over the control board, adjusting dials, thumbing over trips, punching studs. His hands opened and closed—hands that were withered with approaching age, but hands that still had brutal strength left in them.

Finally the thing swung away from the board, chuckled faintly at him.

"We're going home," it said.

"Home to Mars?"

"That's right."

Lathrop laughed, a laugh that came between his teeth without curling his lips.

"The trip has been too long," he said. "You'll never get me back in time to do any preaching for you. We're millions of light-years from Mars. I'll die before we get there."

The thing flipped slithery tentacles. "We're close to Mars," it said. "Millions of light-years the long way around, of course, but close by the way I set the co-ordinates."

"The fourth dimension?" asked Lathrop, guessing at something he had long suspected.

"I cannot tell you that," the creature said.

Lathrop nodded at the board. "Automatic, I presume. All we have to do is sit and wait. It'll take us straight to Mars."

"Quite correct," the thing agreed.

"That," said Stephen Lathrop, "is all I want to know."

He rose casually, took a slow step forward, then moved swiftly. The thing grabbed frantically for the weapon in its belt, but was too slow. A single blow sent the weapon flying out of a squirming tentacle. The thing squealed pitifully, but there was no pity in Lathrop's hands. They squeezed the life, surely and methodically, out of the writhing, lashing, squealing body.

The Earthman stood on wide-spread legs and stared down at the sprawling mass.

"That," he said, "is for the years you took away from me. That is for making me grow old seeing things I wished I'd never seen. For never a moment of companionship when the sight of space alone nearly drove me mad."

He dusted his hands together, slowly, thoughtfully, as if he tried to scrub something from them. Then he turned on his heel and walked away.

Suddenly he put out one hand to touch the wall. His fingers pressed hard against it. It was really there. A solid, substantial, metal thing.

That settled it, he thought. Stephen Lathrop, archaeologist, really was inside this ship, had really seen the things that lay in outer space. Stephen Lathrop finally was going home to Mars.

Would Charlie still be there? His lips twisted a bit at the memory. Charlie must have hunted for him for a long time—and when he didn't find him, did he go back to the green Earth he always talked about, or did he return to the city site to carry on the work they had done together? Or might Charlie have died? It would be funny—and hard—to go back to Mars and not have Charlie there.

He pressed his hand hard against the metal once again, just to be sure. It still was there, solid and substantial.

He turned back to look at the dead thing on the floor.

"I wish," he said wistfully, "I'd found out what it was."

Dr. Charles H. Carter knew he had done a good job. The book was a little dogmatic here and there, perhaps, a little anxious to prove his hypothesis—but after a man had dug and burrowed in the midden heaps of Mars for over twenty years he had a right to be a bit dogmatic.

He picked up the last page of the manuscript and read it over again:

There is, I am convinced, good reason to believe the Martian race may not be extinct, although where it is or why it went there is a question we cannot answer on the basis of our present knowledge.

Perhaps the strongest argument to be advanced in support of the contention the Martians still may be extant is that same situation which has held our knowledge of them to a minimum—the absolute lack of literature and records. Despite extensive search, nothing approaching a Martian library has been found.

That a people, regardless of the manner in which

their extinction came about, either slowly and only through final defeat by a long-fought danger, or swiftly by some quickly-striking force, should be able or should wish to destroy or conceal all records seems unlikely. Even if the wish had been present, the exigencies of fighting for survival would have made it difficult of accomplishment. In any event, it would seem far more logical that a people, faced with extinction, would have made every effort to leave behind them some enduring record which might at least save their name from the annihilation which they themselves knew they were about to suffer. The better supposition, it would seem, is that the Martians went somewhere and took their records with them.

Nor do we find in the architecture or the art of Mars any hint of a situation which may have ended in the extinction of the race. That the Martians must have realized their planet was not equipped for the continued support of large populations is shown by many trends in art, particularly the symbolism of the water jug. But nowhere is there evidence of any violent, overshadowing danger. Martian art and architecture pursue, throughout their many periods, a natural development that reflects nothing more than the steady growth of a mature civilization.

It is regrettable more cannot be learned from that unique residuary personality, popularly called the Martian Ghost, still residing within the one Martian city which appears to be of comparatively recent date. In my contacts with the Ghost I have received the definite impression that he, if he wished, might provide the key we seek, that he might furnish definite information concerning the present whereabouts and condition of the Martian race. But in dealing with the Ghost one deals with a form of life which has no parallel in modern knowledge, with understanding further complicated by the fact that it is in substance the image of an alien mind.

Carter laid the page down on his desk, reached for his pipe.

The metallic thing that squatted in one corner of the study moved slightly.

"I take it, doctor, that your work is done," it said.

Carter started, then settled back, tamped tobacco in his pipe.

"I'd almost forgotten about you, Buster," he told the robot. "You sit so still."

The man stared out of the window-port that framed the wild, red emptiness of Mars. Fine, weatherworn sand that whispered when one walked. Off to the left the fantastic towers of harder rock which had resisted the forces that had leveled down the planet. To the right the faintest hint of spires and turreted battlements—the Martian city where dwelt Elmer, the Martian Ghost. Nearer at hand the excavations where twenty years of digging and sifting and studying had netted a pitiful handful of facts about the Martian race—facts that lay within the pages of the manuscript piled on his desk.

"No, Buster," he said, "my work isn't done here. I'm only quitting it. Someone will come along some day and take up where I left off. Perhaps I should stay—but these have been lonely years. I'm running away from loneliness and I am afraid I won't succeed. I've been on the verge of it many times before. But something kept me here—the knowledge it was not only my work I was doing, but someone else's work as well."

"Dr. Lathrop's work," rasped Buster's thoughts.

Carter nodded.

Twenty years ago Steve Lathrop had dropped out of sight. Carter could remember perfectly the morning Steve had left for the little outpost of Red Rocks to get supplies. Each detail of that morning seemed etched into his consciousness. During those intervening years he had lived it over and over again, almost minute by minute, trying to unearth even the tiniest incident that might be a clue. But there had never been a clue. Stephen Lathrop, to all intent and purpose, simply had walked off the face of Mars, vanished without a trace. He had left to get supplies; he had never returned. That, in itself, was the beginning and the end. That was all there was.

Soon he would have to start packing, Carter knew. The manuscript was finished. His notes were all in order. All but a few of the specimens were labeled, ready for packing. The laborers had been discharged. As soon as Alf came back, they would have to get to work. Alf had gone to town three days before and hadn't returned—but that was nothing unusual. Somehow, Carter could feel no irritation toward Alf. After all, an occasion such as this, the end of twenty years of labor, called for a spree of some sort.

The last rays of the setting sun streamed into the window and splashed across the room, lighting up and bringing out the color of the collection of Martian water jugs ranged along the wall. Not a very extensive collection when measured against some of those gathered by professional collectors, but a collection that brought warmth into Carter's soul. Those jugs, in a way, represented the advance of Martian culture, starting with the little lopsided jug over on the left up to the massive symbolic piece of art that marked the peak

of the jug cult's development. Jugs from every part of Mars, brought to him by the scrawny, bewhiskered old jug hunters who ranged the deserts in their everlasting search, always hopeful, always confident, always dreaming of the day when they would find the jug that would make them rich.

"Elmer has a guest," said Buster. "Maybe I should be getting back home. Elmer might need me."

"A guest, eh," said Carter, mildly surprised. Elmer had few visitors. At one time the city of the Martian Ghost had been on the itinerary of every tourist, but of late the government had been clamping down. Visitors upset Elmer and inasmuch as Elmer held what amounted to diplomatic status, there was little else the government could do. Occasionally scientists dropped in on Elmer or art students were allowed to spend a short time studying the paintings in the city—the only extensive list of Martian canvases in existence.

"A painter," said Buster. "A painter with pink whiskers. He has a scholarship from one of the academies out on Earth. His name is Harper. He's especially interested in 'The Watchers.' "

Carter knew about "The Watchers," a disturbing, macabre canvas. There was something about its technique that almost turned it alive—as if the artist had mixed his pigments with living fear and horror.

The radiophone on the desk burred softly, almost apologetically. Carter thumbed a tumbler and the ground glass lighted up, revealing a leathery face decorated by a yellow, walruslike mustache, outsize ears and a pair of faded blue eyes.

"Hello, Alf," said Carter genially. "Where are you? Expected you back several days ago."

"So help me, doc," said Alf, "they got me in the clink."

"What for this time?" asked Carter, figuring that he knew. Tales of the doings of an alcoholic Alf were among Red Rocks' many legends.

"A bit of jug hunting," Alf confessed, whuffling his mustache.

Carter could see that Alf was fairly sober. His faded eyes were a bit watery, but that was all.

"The Purple Jug again, I suppose," said Carter.

"That's just exactly what it was," said Alf, trying to sound cheerful. "You wouldn't want a fellow to pass up a fortune, would you?"

"The Purple Jug's a myth," said Carter, with a touch of bitterness. "Something someone thought up to get guys like you in trouble. There never was a Purple Jug."

"But Elmer's robot gave me the tip," wailed Alf. "Told me just where to go."

"Sure, I know," said Carter. "Sent you out into the badlands. Worst country on all of Mars. Straight up and down and full of acid bugs. No one's ever found a jug there. No one ever will. Even when the Martians were here, the badlands probably were a wilderness. No one in his right mind, not even a Martian, would live there and you only find jugs where someone has lived."

"Look," yelped Alf, "you don't mean to tell

me Buster was playing a joke on me? Those badlands ain't no joke. The acid bugs darn near got my sand buggy and I almost broke my neck three or four times. Then along came the cops and nailed me. Said I was trespassing on Elmer's reservation."

"Certainly Buster was playing a joke on you," said Carter. "He gets bored sitting around and not having much to do. Fellows like you are made to order for him."

"That little whippersnapper can't do this to me," howled Alf. "You wait until I get my hands on him. I'll break him down into a tinker toy."

"You won't be getting your hands on anyone for thirty days or so unless I can talk you out of this," Carter reminded him. "Is the sheriff around?"

"Right here," said Alf. "Told him you'd probably want a word with him. Do the best you can for me."

Alf's face faded out of the ground glass and the sheriff's came in, a heavy, florid face, but the face of a harassed man.

"Sorry about Alf, doc," he said, "but I'm getting sick and tired of running the boys off the reservation. Thought maybe clapping some of them in jail might help. This reservation business is all damn foolishness, of course, but a law's a law."

"I don't blame you," Carter said. "The Preachers alone are enough to run you ragged."

The sheriff's florid face became almost apoplectic. "Them Preachers," he confided, "are the devil's own breed. Keeping the people stirred up all the time with their talk of evil from the stars and all such crazy notions. Earth's getting tough about it, too. All of them seem to come from Mars and they're riding us to find out how they get that way."

"Just jug hunters gone wacky," declared Carter. "Wandering around in the desert they get so they talk to themselves and after that anything can happen."

The sheriff wagged his head. "Not so sure about that, doc. They talk pretty convincing —almost make me believe them sometimes. If they're crazy, it's a queer way to go crazy —all of them alike. All of them tell the same story—all of them got a funny look in their eyes."

"How about Alf, sheriff?" asked Carter. "He's my right-hand man and I need him now. Lots of work to do, getting ready to leave."

"Maybe I can stretch a point," said the sheriff, "long as you put it that way. I'll see the district attorney."

"Thanks, sheriff," said Carter. The ground glass clouded and went dead as the connection was snapped at the other end.

The archaeologist swung around slowly from his desk.

"Buster," he challenged, "why did you do that to Alf? You know there is no Purple Jug."

"You accuse me falsely," said Buster. "There is a Purple Jug."

Carter laughed shortly. "It's no use, Buster. You can't get me all steamed up to look for it."

He rose and stretched. "It's time for me to eat," he said. "Would you like to come along and talk with me?"

"No," said the robot. "I'll just sit here and think. I thought of something that will amuse me for a while. I'll see you later."

But when Carter came back, Buster was gone. So was the manuscript that had been lying on the desk. Drawers of filing cases that lined one side of the room had been pried open. The floor was littered with papers, as if someone had pawed through them hurriedly, selecting the ones he wanted, leaving the rest.

Carter stood thunderstruck, hardly believing what he saw. Then he sprang across the room, searched hastily, a sickening realization growing on him.

All the copies of his manuscript, all his notes, all his key research data were gone.

There was no doubt Buster had robbed him. And that meant Elmer had robbed him, for Buster was basically no more than an extension of Elmer, a physical agent for Elmer. Buster was the arms and legs and metallic muscles of a thing that had no arms or legs or muscles.

And Elmer, having robbed him, wanted him to know he had. Buster deliberately had set the stage for suspicion to point him out.

Charles Carter sat down heavily in the chair before his desk, staring at the papers on the floor. And through his brain rang one strident, mocking phrase:

"Twenty years of work. Twenty years of work."

The mistiness that hung among the ornamental girders swirled uneasily with fear. Not the old, ancestral fear that always moved

within its being, but a newer, sharper fear. Fear born of the knowledge it had made mistakes—not one alone, but two. And might make a third.

The Earth people, it knew, were clever, far too clever. They guessed too closely. They followed up their guesses with investigation. And they were skeptical. That was the worst of all, their skepticism.

It had taken them many years to recognize and accept him for what he really was—the residual personality of the ancient Martian race. Even now there were those who did not quite believe.

Fear was another thing. The Earthlings knew no fear. Quick, personal glimpses of it undoubtedly they knew. Perhaps even at times a widespread fear might seize them, although only temporarily. As a race they were incapable of the all-obliterating terror that lay forever on the consciousness of Elmer, the Martian Ghost.

But there were some, apparently, who could not comprehend even personal fear, whose thirst for knowledge superseded the acknowledgment of danger, who saw in danger a scientific enigma to be studied rather than a thing to flee.

Stephen Lathrop, Elmer knew, was one of these.

Elmer floated, a cloudy thing that sometimes looked like smoke and then like wispy fog and then again like something one couldn't quite be sure was even there.

He had known he was making a mistake with Lathrop, but at the time it had seemed the thing to do. Such a man, reacting favorably, would have been valuable.

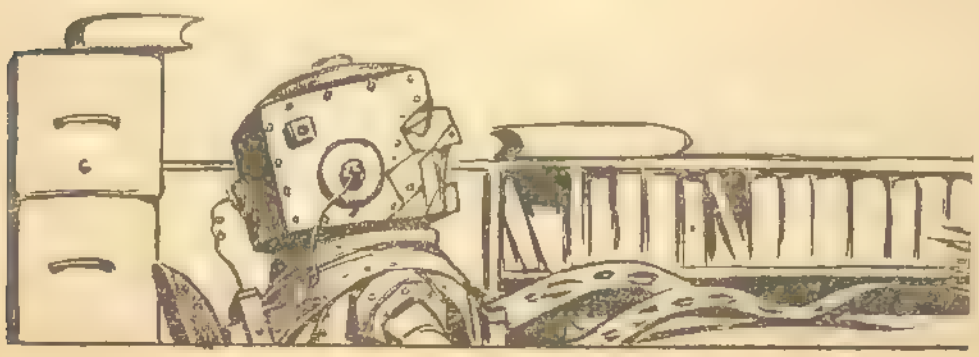
But the result had not been favorable. Elmer knew that much now, knew it in a sudden surge of fear, knew he should have known it twenty years before. But one, he told himself, cannot always be sure when dealing with an alien mind. Earthmen, after all, were newcomers to the planet. A few centuries counted for nothing in the chronology of Mars.

It was unfair that a Ghost be left to make decisions. Those others could not expect him to be infallible. He was nothing more than a blob of ancestral memories, the residue of a race, the pooling of millions of personalities. He was nothing one could prove. He was hardly life at all—just the shadow of a life that had been, the echo of voices stilled forever in the silence of millennia.

Elmer floated gently toward the room below, his mind reaching out toward the brain of the man sitting there. Softly, almost furtively, he sought to probe into the mental processes of the pink-whiskered artist. A froth of ideas, irrelevant thoughts, detached imagining, and then—a blank wall.

Elmer recoiled, terror seizing him again, a wild wave of unreasoning apprehension. It was the same as it had been the many previous times he had tried to reach this mind. Something must be hidden behind that unyielding barrier, something he must know. Never before had there been an Earthman's mind he could not read. Never before had his groping thoughts been blocked. It was baffling—and terrifying.

Mistakes! The idea hammered at him remorselessly. First the mistake with Lathrop. Now this—another mistake. He never should have allowed Peter Harper to come, despite the recommendations of the Earthian embassy, the unquestioned references of the college out on Earth. He would have had right and precedent in such refusal. But he had allowed hundreds of art students and art lovers to view



his canvases—to have refused Harper might have aroused suspicion.

The awful idea he was being made the victim of an Earthian plot surged up within him, but he rejected it fiercely. Earthmen never had plotted against him, always made it a meticulous point of honor to accede to all his wishes, to grant him, as the last representative of a great race, considerations over and above those to which his diplomatic status entitled him.

Peter Harper said: "Elmer, your people may have been greater than we know. That painting"—he gestured toward "The Watchers"—"is something no Earthman has the technique to produce."

Elmer's thoughts milled muddily, panic edging in on him. Other Earthmen had said the same thing, but there was a difference. He could read their minds and know they meant what they said.

"You could help us, Elmer," Harper said. "I've often wondered why you haven't."

"Why should I?" Elmer asked.

"Brother races," the man explained. "The Martians and the Earthmen. Your race, whatever happened to them, wouldn't want to keep their knowledge from us."

"I do not have the knowledge of the Martian race." Elmer's thoughts were curt.

"You have some of it. The fourth dimension, for example. Think of what we could do with that. A surgeon could go inside his patient and fix him up without a single knife stroke. We could press a button and go a million miles."

"Then what?" asked Elmer.

"Progress," said Harper. "Certainly you must understand that. Man was Earthbound. Now he has reached the planets. He's already reaching toward the stars."

"Maybe when you reach the stars you won't like what you find," Elmer declared. "Maybe you'll find things you'd wish you left alone."

Harper grinned and pawed at his pink chin whiskers.

"You're an odd one," he said.

"To you," Elmer said, "the word is 'alien.'"

"Not exactly," declared Harper. "We had things like you back on Earth, only no one except old women believed in them. They were just something to talk about on stormy nights when the wind whistled down the chimney. We called them ghosts, but we never would admit that they were real. Probably ours weren't really real, sort of feeble ghosts, just the beginning of ghosts."

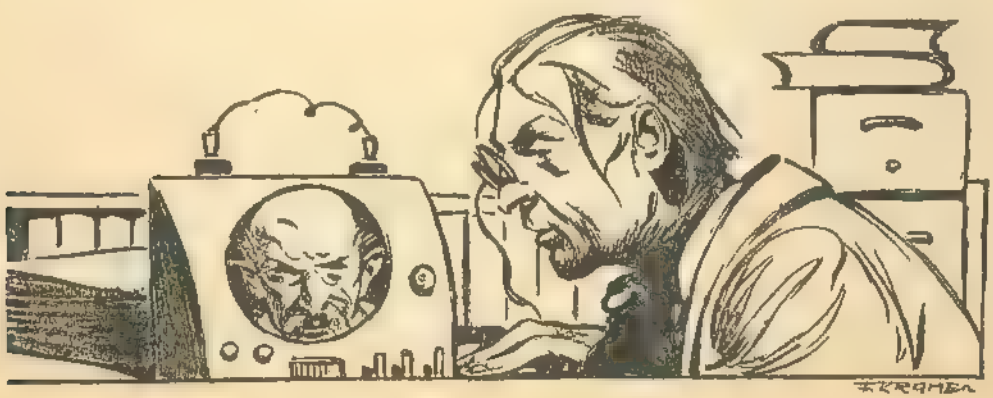
"They never had a chance," said Elmer.

"That's right," Harper agreed. "As a race, we haven't lived long enough. We seldom stay in one place long enough to allow it to soak up the necessary personality. There are a few rather shadowy ghosts in some of the old castles and manor houses in Europe, maybe a few in Asia, but that's about all. The Americans were apartment dwellers, moved every little while or so. A ghost would get started in one pattern and then would have to change over again. I suspect that was at least discouraging, if not fatal."

"I wouldn't know," said Elmer.

"With the Martians, of course, it was different," went on Harper. "Your people lived in their cities for thousands of years, perhaps millions of years. The very stones of the place fairly dripped with personality—the accumulated personality of billions of people—that whatever-you-call-it that stays behind. No wonder the Martian Ghosts got big and tough—"

Metallic feet clicked along the corridor out-



side. A door opened and Buster rolled in.

"Dr. Carter is here," he said.

"Oh, yes," said Elmer, "he wants to see me about a manuscript."

There was no way to get out. Stephen Lathrop now was convinced of that. Elmer's city, so far as he was concerned, might just as well have been in the depths of space.

In the three days which had passed since he had stumbled in off the desert, he had searched the place methodically. The central spire had been his last chance. But even before he climbed the stairs he knew it was no chance at all. When Elmer decided to make the place a rattrap, he really made it one.

A web of force surrounded the entire city, extending three feet or so from the outer surfaces. Doors would open, so would windows. But that meant nothing, for one could go no farther.

Buster apparently had given up trying to stalk him. Now, it appeared, the game had settled to a deadlock. Buster didn't dare to tackle him so long as he had the weapon and he, on the other hand, couldn't leave the city. Elmer probably had decided on starving him out.

Lathrop knew, deep within him, that he was licked, but that knowledge still was something he would not admit. In the end, logic told him, he would give up, let Elmer wipe out the memory of those twenty years in space, replace them with synthetic memories. Under different circumstances, he might have welcomed such a course, for the things he had seen were not pleasant to remember—certainly Elmer could supply him with a more pleasant past. But the proposition was too highhanded to be accepted without a fight, without at least a struggle to maintain his right to order his own life. Then, too, there was the feeling that if he lost the knowledge of the outer worlds he would be losing something the Earth might need, the opportunity to approach the problem scientifically rather than hysterically, as the Preachers approached it.

He sat down heavily on a step, pulled the weapon from his belt and held it, dangling from a hand that rested on his knee. Although there had been no sign of Buster for a long time, there was no telling when the robot might pop up and once Buster laid a tentacle on him, the game was over.

The weapon was not easy to grip. It was not made for human hands, although its operation was apparent—simply press the button on the side. He shifted it in his hand and studied it. Had it not been for the weapon, he knew, there were times when he would have been tempted to write off that trip through space as the product of an irrational mind.

But there the weapon was, a familiar, tangible thing. For years he had seen it dangling from the belt of the thing that piloted the ship. Even now he remembered how it had flashed in the light from the instrument panel as he knocked it from the grasp of the being, then closed in to make his kill.

He didn't know what the weapon was, but Buster knew and Buster wasn't coming near it.

It was increasingly hard, he found, to continue thinking of the creature of the spaceship as merely a "thing," as something that had no identity, but he knew that despite mounting suspicion, he must continue to think of it as such or give way to illogic.

There was, he knew, good reason to suspect it might have been a member of the old Martian race, although that, he told himself, would be sheer madness. The Martian race was dead.

And yet, Elmer without a doubt had played some part in placing him aboard the ship—and who else but the Martian race would Elmer be in league with? The Elmer had believed, as did the thing, that he would become one of the Preachers of Evil was evident. That his refusal to so become had enraged Elmer was equally apparent.

Elmer, of course, had taken steps which ordinarily would have protected him against being linked with the junket in space. The Preachers probably did not even dream Elmer had anything to do with their experiences.

For the hundredth time, Lathrop forced his thoughts back along the trail to that interval between the moment he had left the excavation site until the moment he had found himself aboard the spaceship. But the blank still existed—a black, tantalizing lack of memory. Whatever had transpired in that interval had been wiped clean from his brain. He knew now Elmer had done that, hadn't bothered to supply him with fictitious memories to fill in the gap.

Granting, however, that Elmer was engineering the indoctrination of the Preachers, what could be his purpose? Why did he bother

about it? What possible interest could he have in whether the human race knew of the evil that existed in the outer worlds—why be so insistent that the race hide from the danger rather than fight it? There was illogic somewhere—perhaps a racial illogic, a wrong way of thinking.

Another funny thing. What had happened to the ship? Of all the incredible happenings, that had been the most insane.

The creature had been right about the ship being automatic. Snicking, whispering controls had driven it back to Mars in a few weeks' time, had brought it down to a bumpy landing not more than a mile from Elmer's city. That, Lathrop knew, could be explained by engineering—but there was no explanation, no logic in what had happened when he left the ship and walked away.

The craft had shrunk, dwindling until it was almost lost in the sand, until it was no more than an inch or so in length. Lying there, it glistened like a crystal on the desert floor. Then it had shot upward, like a homing bee. Lathrop remembered ducking as it whizzed past his head, remembered watching it, a tiny speck that streaked straight toward the Martian city until he lost it in the glare of the setting sun.

That shrinking must have been automatic, too. There was no hand inside the ship to activate controls. Perhaps the action had become automatic when he opened the port to leave.

Starlight spattered through the narrow portholes in the spire and Lathrop shivered inside his space gear. It was cold there in the tower, for this part of the city was not conditioned against the Martian atmosphere as were some other portions, a concession for Earthly visitors.

From far below came a distant thud of metal striking metal, a rhythmic, marching sound that seemed to climb toward him. Lathrop sat, gun dangling from his knee, starlight sparkling on his helmet, brain buzzing with mystery. Suddenly, he sat erect, tense—that thudding sound was something climbing up the frosty stairs. He waited, wondering what new move might be afoot, realized with a twinge of terror that he was trapped here on the upper step.

Thought calls reached his brain. "Dr. Lathrop, are you up there? Dr. Lathrop!"

"I'm up here, Buster," he called back. "What's eating you?"

"Elmer wants to see you."

Lathrop laughed, said nothing.

"But he really does," insisted the robot. "There's an old friend of yours with him. Dr. Carter."

"It's a trap," said Lathrop. "You ought to think up a better one than that."

"Aw, doc, forget it," pleaded Buster. "It isn't any trap. Carter's really down there."

"What's he there for?" snapped Lathrop. "What's Elmer got against him?"

"He wrote a book—"

Buster's thoughts broke off in wild confusion.

"So he wrote a book."

"Look, doc, I shouldn't have said that," whined Buster. "I wasn't supposed to say it. You caught me unawares."

"You should have made me believe Charlie was down there, all chummy with Elmer, waiting to talk me out of my foolishness. Elmer will chalk one up on you for this."

"Elmer doesn't need to know," suggested Buster. The footsteps stopped. The tower swam in silence.

"I'll think about it," Lathrop finally said. "But I'm not promising anything. If I had a robot that tried to hide things from me, I'd junk him in a hurry."

"Aren't you going to come down, doc?"

"Nope," said Lathrop. "You come up. I'm waiting for you. I have the gun ready. I won't stand for any monkey business."

The footsteps started again, slowly, reluctantly. They climbed for a long minute, then stopped again.

"Doc," said Buster.

"Yes, what is it?"

"You won't hurt me, doc. I got to bring you in this time. Elmer isn't fooling."

"Neither am I," said Lathrop.

The thudding began again, came closer and closer, the frosty steps ringing to the heavy tread of the climbing robot. Buster's bulk heaved itself up the last flight, moved out onto the landing. Facing the stairs, Buster stood waiting, his crystal lenses staring at the man.

"So you came to get me," Lathrop said. He flipped the gun's muzzle at Buster and chuckled.

"You have to come, doc," said Buster. "You just have to come."

"I'll come," said Lathrop, "but first you're going to talk. You're going to tell me a lot of things I need to know."

A flood of protest washed out from Buster's electronic brain. "I can't," he wailed. "I can't!"

Lathrop leveled the gun, his gloved finger covering the button. His eyes grew steellike in the light from the stars.

"Why has Elmer got Charlie?" he demanded. "What did he say in that book?"

Buster hesitated. From where he sat, the Earthman could sense the confusion that tore him.

"O. K.," said Lathrop calmly, "I'll have to let you have it."

"Wait!" shrieked Buster. "I'll tell you!"

His thought-words were tumbling over one another. "Dr. Carter said the Martians might be still alive. Elmer doesn't like that. He doesn't want anyone to even think they're still alive."

"Are they?" snapped Lathrop.

"Yes. Yes, they're still alive. But they aren't here. They're some place else. They went into another world. They were afraid of the things from outer space. So they made themselves small. Too small to be of any consequence. They reasoned that when the Evil Beings came they would pass right by them, never even guess that they were there."

"The thing that took me out in space was a Martian, then?"

"Yes, they come out of their world, get big again, to take Earthmen out in space. To show them the evil out there, convince them they cannot fight it, hoping they, too, will do what the Martians did."

Lathrop was silent, reflecting, trying to straighten out his mind. At the bottom of the stairs, Buster fidgeted.

"But, Buster, why do they do this? Why don't they let us find out about these things in our own good time? Why don't they let us work out our own salvation? Why do they insist on us following in their footsteps?"

"Because," said Buster, "they know that they are right."

So that was it. A strait-laced dogmatism that in itself portrayed the character and the nature of the Martian race. His guess concerning Elmer's motives then were right, Lathrop knew. The wrong way of thought. A racial illogic that denied there might be many paths to truth. Coupled, perhaps, with an overdeveloped sense of rigid duty to fellow races. There were Earthly parallels.

"Busybodies," Lathrop summed it up.

"What was that?" asked Buster.

"Skip it," Lathrop told him. "It doesn't matter. You wouldn't understand."

"There are many things," said Buster, sadly, "that I don't understand. Maybe Elmer does, but I don't think he does. It doesn't bother him. That's because he's a Ghost and I'm only a robot. You see, he's sure he's right. I can't be sure. I wish I could be. It would make things easier."

The Earthman grinned at the robot, flipped the gun.

"You Earthmen think differently," Buster went on. "Your minds are limber. You never say a thing is right until you've proven it. You never say a thing's impossible until you've proven that. And one right, so far as you are concerned, isn't the only right. To you it doesn't matter how you do a thing just so you get it done."

"That, Buster," said Lathrop gently, "is because we're a young race. We haven't gotten hidebound yet. Age may give a race a different viewpoint, an arrogant, unswerving viewpoint that makes it hard to get at truth. The Martians should come to us straightforward, explain the situation. They shouldn't try to propagandize us. The human race, from bitter experience, hates propaganda, can spot it a mile away. That's why we're suspicious of the Preachers, make things so tough for them."

"The Martians don't trust you," Buster said. "You take over things."

Lathrop nodded. It was, he realized, a legitimate criticism.

"They're a cautious people," Buster went on. "Caution played a part in the course they took. They wanted to be sure, you see. When the future of the race was at stake, they couldn't take a chance. Now they're afraid of the human race—not because of what it can do now, but what it might do later. And still they know you are the closest to them, in thought and temperament, of any peoples in the Universe. They feel that for that reason they should help you."

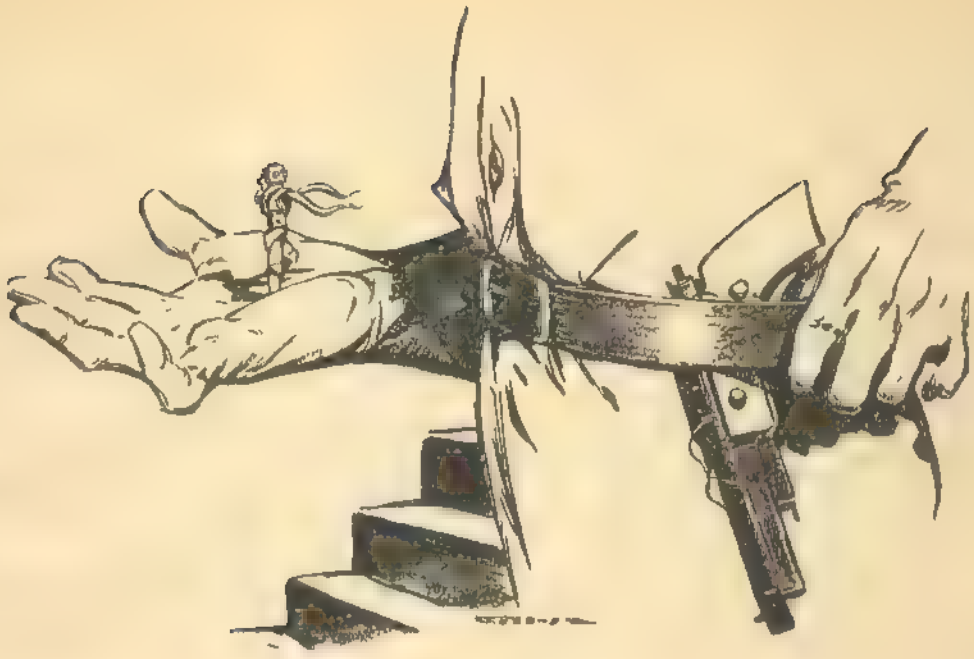
"Look, Buster," said Lathrop, "you told me they became small. You mean they went into a subatomic universe?"

"Yes," said Buster. "They found a principle. It was based on the fourth dimension."

"What has the fourth dimension got to do with being small?"

"I don't know," said Buster.

Lathrop got to his feet. "All right," he said. "We'll see Elmer now."



He moved slowly down the stairs, the weapon dangling from a hand that swung by his side. Below Buster waited, meekly.

Suddenly Buster moved, straight up the stairs, charging with tentacles flailing. Lathrop jerked back, retreating before the rush. For a fumbling moment he held his breath as he brought up the clumsy gun and pressed the button.

A tentacle slammed against his shoulder and knocked him sidewise even as he fired. He brought up against the stone wall of the staircase with a jolt, the gun still hissing in his hand.

For an instant Buster halted as the faint blue radiance from the weapon spattered on his armor, then tottered, half fell, regained erectness with an effort. Slowly at first, then with a rush, he began to shrink—as if he were falling in upon himself.

Lathrop lifted his finger from the button, lowered the gun. Buster was trying to scramble up the steps, still trying to get at him, but the stairs now were too high for him to negotiate.

In stricken silence, Lathrop watched him grow smaller and smaller, just as the spaceship had grown smaller out there on the desert.

Thrusting the gun back into his belt, Lathrop knelt on the stairs and watched the frantic running of the tiny robot, running as if he were trying to escape from something, trapped by his very smallness on a single tread.

Buster was no more than two inches tall, seemed to be growing no smaller. Gently, Lathrop reached down and picked him up. He shuddered as he held the robot in his hand.

Buster, he knew, had almost succeeded in his purpose, had almost captured him. Had lulled him to sleep by his almost human attributes, by his seeming friendliness. Perhaps Buster had figured out it was the only way to get him.

He lifted his hand until it was level with his face. Buster waved stubby tentacles at him.

"You almost did it, chum," said Lathrop.

A feeble thought piped back at him: "You wait until Elmer gets at you!"

Lathrop said grimly: "I have Elmer where I want him now."

He tucked the squirming Buster carefully in a pocket and started down the stairs.

Outside the door that had been locked to keep him in, Peter Harper carefully checked himself. His beard, he decided, was just a shade too red. He concentrated on it and the beard grew pink.

"The fools!" he hissed in contempt at the still-locked door.

His body, he knew, was all right—just as it had been before. But his mind was in a mess. Standing rigidly, he sought to smooth

it into pattern, forcing it into human channels, superimposing upon it the philosophy he hated.

All this, he told himself, would be over soon. The end of his mission finally was in sight—the mission he had worked so hard to carry out.

Footsteps were coming down the corridor and Harper forced himself to relax. He fumbled in his jacket pocket for a cigarette, was calmly lighting it as Stephen Lathrop, still clad in space gear, came around the corner.

"You must be Harper," Lathrop said. "I heard that you were here."

"Just for a time," said Harper. "Studying the canvases."

"You are lucky. Not many people have that chance."

"Lucky. Oh, yes. Very lucky." Harper rolled the phrases on his tongue.

Lathrop crinkled his nose. "Do you smell anything?" he asked.

Harper took the cigarette from between his lips. "It might be this. It's not a usual brand."

Lathrop shook his head. "Couldn't be. Just caught a whiff. Like something dead."

Lathrop's eyes swept the man from head to foot, widened a bit at the alarming whiskers.

"The beard is quite natural, I assure you," Harper declared.

"I do not doubt it," Lathrop said. "You should wear a purple tie."

Without another word, he wheeled and tramped away. Harper watched him go.

"Purple tie!" spat Harper. Hate twisted his face.

Buster scurried back and forth across the table top, tiny feet beating out a frenzied minor patter.

"There is no use in arguing," Elmer said. "This talk of Earthmen co-operating with the Martians is impossible. It would never work. They'd be at one another's throats before they were acquainted. You, Lathrop, killed the Martian out in space. There was no provocation. You simply murdered him."

"He got in my hair," said Lathrop. "He'd been in it for almost twenty years."

"That's what I mean," said Elmer. "If the two races could get along, they'd be unbeatable. But they couldn't get along. They'd grate on one another's nerves. You have no idea the gulf that separates them—not so much the gulf of knowledge, for that could be bridged, nor a lack of co-operation, for the Martians know that as well as the race of Earth, but temperamentally they would be poles apart."

Carter nodded, understandingly: "They'd be old fossils and we'd be young squirts."

"But we could work at long range," insisted Lathrop. "They could stay in their subatomic world, we could stay where we are. Elmer could act as the go-between."

"Impossible," Carter argued. "There is the time angle to consider. A few days for us must be a generation for them. Everything would be speeded up in their world—even the rate of living. The time factor would be basically different. We could not co-ordinate our effort."

"I see," said Lathrop. He tapped his fingers on the table top. Buster scurried to the other side, as far as he could get from the tapping fingers.

Lathrop shot a quick glance at Elmer. "Where does that leave us?"

"Just where we started," Elmer said. "You've made Buster useless to me, but that is of little matter. Another robot can be sent me."

"Maybe Buster will grow up again," Lathrop suggested.

Elmer was in no mood for jokes. "You have the weapon," he went on, "but that is worthless against me. With Buster gone, you have cheated yourself out of a quick death in case you refuse to have your memories replaced. But that is inconsequential, too. I can let you starve."

"What a happy soul you are!" said Carter, dryly.

"I suppose I should say I regret the situation," Elmer said. "But I don't. You must understand I can't let you go. In order that the Martian plan may go on, the knowledge you hold must never reach your race. For once your race knew the Martians were alive, they would find a way to ferret them out."

"And," suggested Lathrop, "the Evil Beings must continue to be something mystic, something not quite real, something for fools to believe in."

Elmer was frank. "That is right. For if your people knew the truth they would take direct action. And that would be wrong. One cannot fight the Evil Ones, one can only hide."

"How are you so sure?" snapped Carter.

"The Martians," said Elmer, solemnly, "ex-

hausted every other possibility. They proved there could be no other way."

Lathrop chuckled in his corner. "There is one thing you have forgotten, Elmer."

"What is that?"

"Harper," said Lathrop. "What are you going to do about Harper?"

"Harper," declared Elmer, "will leave here in a few days. He will never know what happened: Not even that you were here."

"Oh, yes, he will," said Lathrop. "I just talked to him. On my way to see you."

Elmer writhed uneasily. "That's impossible. Buster locked him in his room."

"Locks," declared Lathrop, "don't mean a thing to Harper."

Carter started at the tone of Lathrop's voice. "What do you mean?" he asked.

"Harper," Lathrop started to say, "is a—" but a scream from the next room cut him short. A scream followed by the snickering of a blaster.

The two men sprang to their feet, stood in breathless silence. Elmer was a streak of fog flashing through the air.

"Come on!" yelled Lathrop. Together the two humans followed Elmer, who had faded through the door.

Starlight from the tall windows lit the other room with spangled light and shade. In it figures moved, unreal figures, like trick photography on a stereovision screen.

Beside one of the windows stood a man, blaster at his hip. Advancing upon him, crouching like a beast of prey stalking food, was another man. The smell of burned flesh tainted the room as the blaster whispered.

Something had happened to the painting of "The Watchers." It had swung on a pivot in its center, revealing behind it a cavern of blackness. Starlight was shattered by a glinting object that stood within the darkness.

The man who held the blaster was talking, talking in a baffled, ferocious, savage undertone, talking to the thing that advanced upon him, a rattle of words that had no meaning, half profanity, half pure terror, all bordering on madness.

"Alf!" shrieked Carter. But Alf didn't seem to hear him, went on talking. The thing that stalked him, however, swung about, huddled for an indecisive instant.

"Lights!" yelled Lathrop. "Turn on those lights!"

He heard Carter fumbling in the darkness, hunting for the switch. Scarcely breathing, he stood and waited, the Martian weapon in his hand.

The man in the center of the room was shambling toward him now, but he knew he didn't dare to shoot until the lights were on. He had to be sure what happened.

The switch clicked and Lathrop blinked in the sudden flood of light. Before him crouched Peter Harper, clothes ripped to smoldering ribbons, face half eaten away by the blaster, one arm gone—crouching as if to spring.

Lathrop snapped the weapon up, pressed the button. The blue radiance flamed out, bored into Peter Harper.

There was no shrinking this time. The spear of blue seemed to slam the man back on the floor and pin him there. He writhed and blurred and ran together. The clothes were gone, the eaten face, with the scraggly. pink whiskers disappeared. Instead came taloned claws and a face that had terrible eyes and a parrot beak. A thing that mewed and howled and yammered. A thing that struggled in vicious convulsions and melted—melted and stank.

Carter stared in horror, hand covering his nose. Lathrop released the pressure on the trip, held the gun alertly.

"One of the things from space," he said, his voice tense and hard. "One of the Evil Beings."

Alf staggered down the room, like a drunken man.

"I just climbed through the window," he mumbled. "I just climbed through the window—"

"How did you get in here?" Carter yelled at him. "Elmer has the city screened."

"The screen," said Elmer's thoughts, "works only one way. It keeps you in, it doesn't keep you out."

Carter turned his attention to the mess upon the floor, trying not to gag. "He wanted something," he said. "He came for something."

"He came because he was afraid," Lathrop declared. "There is something here those races are afraid of. Something they had to get at and destroy."

Alf grabbed at Carter's arm. "Charlie," he whimpered, "tell me if it's true. Maybe I'm drunk. Maybe I got them D.T.'s again."

Carter jerked away. "What's the matter with you, Alf?" he snapped.

"The Purple Jug," gasped Alf. "So help me, it's the Purple Jug."

They saw it then.

The Purple Jug was the thing that had stood in the cavern back of "The Watchers." It was the thing that had shattered the starlight.

It was a thing of beauty, of elegance and grace. A piece of art that snatched one's breath away, that made a hurt rise in the throat and strangle one.

"It wasn't like you said," Alf accused Carter. "It wasn't just a myth."

Something flashed above the jug's narrow lip, a silvery streak that struck fire with the light and soared like a burnished will-o'-the-

"You're quite right," said Elmer. "The Purple Jug is the home of the Martian race. It contains the subatomic universe to which they fled."

Lathrop glanced up, saw the shimmery blot that was Elmer up against the roof.

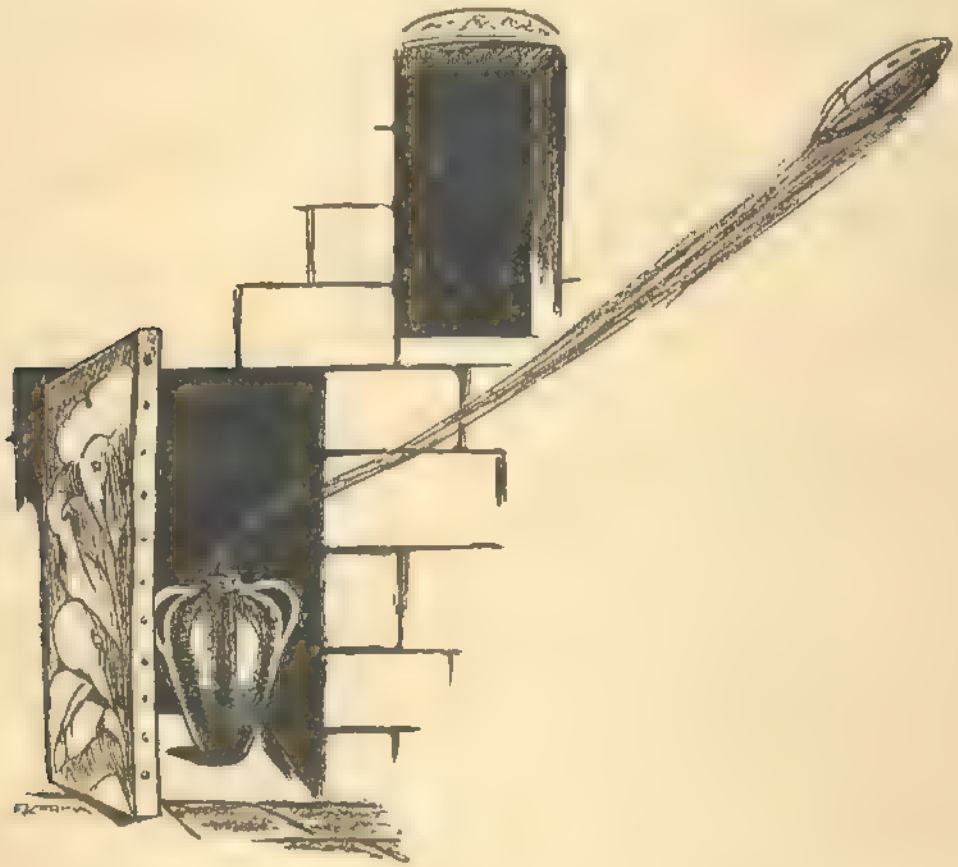
"Then the jug was what Harper wanted," Carter said, his voice just a bit too calm, calm to keep the terror out.

The spaceship had settled on the floor, was rapidly expanding.

"Quick, Elmer," urged Lathrop, "tell me how the Martians grew small."

Elmer was silent.

"Buster said it was tied up with the fourth dimension," Lathrop said. "I can't figure what the fourth dimension has to do with it."



wisp out into the room. Something that swelled and grew—grew until it was fist size and one could see it was a tiny space craft.

"One of the Martian ships!" yelled Lathrop. "One of them coming out of the subatomic!"

And as the last words fell from his lips, he stiffened, grew rigid with the knowledge that snapped into his brain.

Elmer still was silent, silent so long Lathrop thought he wasn't going to speak. But finally his thoughts came, spaced and measured with care, precise:

"To understand it you must think of all things as having a fourth dimension or fourth-dimensional possibilities, although all things do not have a fourth-dimensional sense. The

Martians haven't. Neither have the Earthmen. We can't recognize the fourth dimension in actuality, although we can in theory.

"To become small, the Martians simply extended themselves in the direction of the fourth dimension. They lost mass in the fourth-dimensional direction, which reduced their size in the other three dimensions. To put it graphically, they took the greater part of themselves and shoved that greater part away where it wouldn't bother them. They became subatomically small in the first three dimensions, extended their fourth dimension billions of times its original mass."

Lathrop nodded slowly, thoughtfully. It was a novel idea—all things had a fourth dimension even if they didn't know it, couldn't know it, since they had no sense which would recognize the fourth dimension.

"Like stretching a rubber band," said Carter. "It becomes longer but thinner. Its mass is increased in length, reduced in breadth and thickness."

"Exactly," said Elmer. "They reverse the process to become larger again, drawing mass from the fourth-dimensional direction."

Silence fell, was broken by the soft whine of whirling metal. The entrance port of the spaceship, now grown to normal size, was opening.

The port fell smoothly back and a Martian waddled out. Lathrop stood rooted to the floor, felt the short hairs on the back of his neck stirring, struggling to arise as hackles.

The Martian waddled forward and stopped in front of them, his tentacles writhing gently. But when he spoke, he did not address the humans. He spoke to Elmer.

"You have shown them the jug?"

"I did not show it to them," Elmer said. "They saved it for us. They killed an Evil One who masqueraded as a human. He would have stolen it, perhaps destroyed it. Lathrop recognized him."

"I smelled him," Lathrop said.

The Martian did not notice Lathrop or the others. It was as if they weren't there, as if Lathrop hadn't spoken.

"You have failed your duty," the Martian said to Elmer.

"I am beyond duty," Elmer replied. "I owe you nothing. I'm not even one of you. I'm just a shadow of those of you who have been. There are many times I do not think as you do. That's because your thinking has outstripped me and because I'm still living in the past and can't understand some of the philosophy you hold today. A part of me must be always in the past, because the past accounts for all of me. For countless centuries I lived here with never a sign of recognition from you. It wasn't until you needed me that you came out of your Universe to find me. You asked my help and I agreed. Agreed because the memories that make me up gave me racial pride, because I couldn't let my own race down. And yet, in face of all that, you talk to me of duty."

"The Earthmen," said the Martian deliberately, "must die."

"The Earthmen," Lathrop declared, "don't intend to die."

Then, for the first time, the Martian faced him, stared at him with fish-bleak eyes. And Lathrop, staring back, felt slow, cold anger creep upon him. Anger at the arrogance, the insolence, the scarcely veiled belief that the Earth race was inferior, that some of its members must die because a Martian said they must. Arrogance that made the Martians believe they could conduct a crusade to bend the human race to the Martian way of thinking, use human beings to sell the race the dogma that had sent the Martians fleeing before a threat from the outer stars.

"I killed one of you before," snapped Lathrop, "with my bare hands."

It wasn't what he would have liked to have said. It was even a childish thing to say.

Through his mind ran bits of history, snatched from the Earthian past—before space travel. Bits that told of the way inferior races had been propagandized and browbeaten into trends of thought by men who wouldn't wipe their feet on them even while they sought to dictate their ways of life. And here it was again!

He would have liked to have told the Martian that, but it would have taken too long, maybe the Martian wouldn't even understand.

"Where's the robot?" asked the Martian.

"Yeah, where's Buster?" yelped Alf. "I got a score to settle with that rattletrap. That's why I came here. I swore I'd bust him down into a tinker toy and so help me—"

"Keep quiet, Alf," said Carter. "Buster is a toy now. One that scoots along the floor."

"Get going," Lathrop told the Martian. "Buster isn't here to help you."

The Martian backed away. Lathrop sneered at him.

"Run, damn you, run! You're good at that. You ran away from the things out on the stars. You ran away and hid."

"It was the only thing to do," the Martian's thoughts were blubbery.

Lathrop whooped in sudden laughter. "You only think you hid. You're like an ostrich sticking its head into the sand. You hid in three dimensions, yes, but you ran up a fourth-dimensional flag for all the Universe to see. Didn't you realize, you fool, that the Evil Beings might have fourth-dimensional senses, that when you strung your fourth-dimensional selves all to hell and gone you were practically inviting them to come and get you?"

"It's not true," said the Martian smugly. "It couldn't be true. We figured it all out. There is no chance for error. We are right."

Lathrop spat in disgust. Disgust at something that was old and doddering and didn't even know it.

The Martian sidled slowly away, then made a sudden dash, scooped up the Purple Jug, hugging it close against him.

"Stop him!" shrieked Elmer, and fear and terror rode up and down the shriek.

The Martian lunged for the open door of the spaceship, still hugging the jug. Lathrop hurled himself forward, flattening in a flying tackle. His hands fell short, scraped a leathery body, clawing fiercely, closed upon an elephantine leg. A tentacle spatted at his face, broke his grip upon the leg, sent him rolling on the floor.

Alf's blaster crackled and the Martian moaned in high-pitched pain.

"Stop him! Stop him!" Elmer's thoughts were sobbing now.

But there was no stopping him. The Martian already was in the ship, the port was swinging home.

Lathrop pulled himself to one knee, watched the port whirling, the ship already starting to grow small.

"There's no use," he said to Elmer.

"In a way," said Carter, "that fellow is a hero. He's throwing away his own life to save his race."

"To save his race," Lathrop echoed bitterly. "He can't save his race. They're lost already. They were lost the first time they did a thing and said that it was right, irrevocably right —that it couldn't be wrong."

"He can take his ship down into the subatomic," argued Carter, "and then the jug will be subatomic, too. We'll never find it. No one will ever find it. But he, himself, can't get back into it. He's barring himself from his own Universe."

"It can be found," said Lathrop. "It can be found no matter how small he makes it. Maybe it won't even survive being pushed down into a state smaller than the subatomic, but if it does that only means the mass pushed into the fourth-dimensional direction will become longer or greater or whatever happens to mass in the fourth dimension. And that will make it all the easier for those chaps out on the stars to spot it."

The ship was no bigger than the end of one's finger when it rose into the air. In a moment it was a mote dancing in the light and then was gone entirely.

Carter stared at the space where it had been. "That's that," he said. "Now we fight alone."

"We fight better alone," growled Lathrop. He patted the weapon at his side. "Harper died when I turned this on him. He didn't shrink, like Buster. It acted differently on the two of them. There's something in this gun those babies are afraid of. The Martians should have known it, but they didn't. They were too sure that they were right. They said the record was closed, but that didn't make it closed."

He patted the gun again. "That's why Harper, or whatever Harper was, wanted to get the jug. He and his race didn't feel safe so long as there was any race in the Universe holding a working knowledge of the fourth dimension."

"Harper," said Elmer, "had a fourth-dimensional sense."

Lathrop nodded. "The Martians didn't have such a sense, couldn't *feel* in the fourth dimension. So they never knew it when they poured themselves into the fourth dimension. But when Harper started being shoved into the fourth dimension, it hurt. It hurt like hell. It killed him."

Carter shrugged. "It's not much to go on."

"The human race," Lathrop reminded him, "has gone a long way on less. The gun is the starting point. From it we learn the basic principle. Pretty soon we'll be able to make Buster his regular size again. And after that we'll be able to do something else. And then we'll find another fact. We'll edge up on it. In the end we'll know more about the fourth dimension than the Martians did. And we'll

have a weapon none of the Evil Beings dare to face."

"We'll do all that," said Carter, "if Elmer lets us go. He still can insist that we stay right here and starve."

"You may go," said Elmer.

They stood, the three of them, staring at the ceiling, where Elmer fluttered wispily.

"You may go," Elmer said again, and there was a bit of insistence in his voice as if he wished they would. "You will find a switch in the hiding place back of where the jug stood. It controls the screen."

They waited in silence while Carter snapped the switch.

"Good night," said Elmer and in his thoughts was a weight of sorrow, a sorrow that seemed to be wrenched out of a millennia of life.

They turned to go, but before they reached the door he called them back.

"Perhaps you would take Buster. Take care of him until you can restore him to normal size again."

"Certainly," said Lathrop.

"And, gentlemen," said Elmer, "just one other thing."

"Yes, what is it, Elmer?"

"There'll be times," said Elmer, "when you won't understand. Times when you get stuck."

"I don't doubt it," Carter admitted.

"When those times come," said Elmer, "come around and see me. Maybe I can help."

"Thank you, Elmer," said Lathrop.

Then he went into the other room for Buster.

THE END.

## EVOLUTION DESIGNS INSTINCT-PATTERNS, TOO

It's a common and unhappy fact that the finest race horse, if he breaks a leg, must be killed as incurable. But any mongrel pup can readily be cured if a leg is broken, if he's given only a minimum of care.

It isn't because a race horse with a once-broken leg can't win races any more that they destroy them, either—a highly bred horse has value as a breeder even after his racing days are over. Trouble is, the evolution of the horse was such that he will not and cannot learn to keep his weight off of an injured leg. Further, supporting his weight artificially in a sling won't work, because it causes fatal internal injuries due to the pressure of the sling, long before the leg heals.

The mutt, on the other hand, immediately and instinctively takes his weight off the bad leg, and keeps it off until healing is complete—even, actually, long after, since the habit of favoring it is quickly established.

There's good evolutionary reason behind that. No animal in its right mind is anxious to attack a wound-maddened wolf, or any other powerful, heavily armed carnivore. It's no doubt easier to kill a wolf with a broken leg than a whole wolf—but there's no percentage in taking the fang-slashing punishment wolf-killing involves when much easier game is to be had.

Now a horse with a broken leg, on the other hand—that's any carnivore's meat. He can't run, he can't kick, and he never was equipped for tooth-and-fang fighting. In the ages of equine evolution, it never did a horse any good to favor a broken leg—he died, anyway. In the horse family, broken-leg favoring had no survival value; in the dangerously toothed and savage dog family, it did.

# SPACE FIX

## By R. S. Richardson

***FIRST** part of a two-part discussion of astragation—a definite, carefully worked-out system of finding your position anywhere in the Solar System. This article may well serve as a basic course in the science for the first interplanetary travelers that will almost certainly take off from Earth before the copyright on this material expires!*

"One of the most important members of a combat crew assigned to an airplane is the navigator. No matter how good the pilot or the bombardier, no long-range mission can be accomplished without a competent navigator. These missions have to be carried out by day or night over land or water and only by accurate navigation can the mission be accomplished."—From a statement issued by the office of the chief of the air corps.

### MEMO TO THE FUTURE

The quotation above is an extract from a form letter that has been widely circulated by the United States army air corps. Today first-class navigators are in demand as never before. Men who prepare for battle by learning about the altitude of Dubhe, the declination of Mars, and the hour angle of the Vernal Equinox. Their names may never loom large in the headlines, but when history is made over Tokyo they will have had their share in the making of it.

It is the writer's considered opinion that some day—one thousand or ten thousand or as many years from now as you like—a letter essentially identical with the one quoted here is going to be written. Change "airplane" to "spaceship" and "land or water" to "planet or satellite" and this one could be filed away for future reference. Without the slightest desire to enter into competition with Nostradamus and other professionals in the prophecy business, nothing could seem more certain that when space flight does come there is going to be a crying need for navigators—beg pardon—astragators. For you just naturally can't expect to get to Mars flying by the seat of your pants!

Furthermore, it would seem that out of all the various aspects of space travel—fuel, speed, radius of action, et cetera—on none may we feel so sure of ourselves as that of astragation. Doubtless fifty years hence our pictures of rocket craft will look as crude as the engravings in the Jules Verne books do today. But it is hard to see how the principles of astragation can differ radically from the principles upon which nautical astronomy and ce-

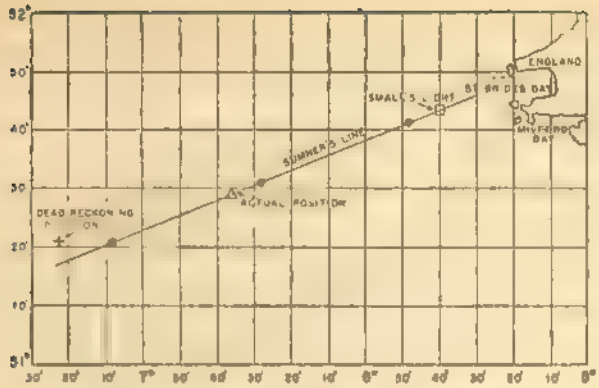



Figure 1. Chart showing the position of Sumner's ship when the "line of position" was first used in navigation.

lestial mechanics are based. In fact, *astragation would appear to be the one subject we can discuss with confidence while we have yet to journey a thousand years in time before we reach it.*

One reason for being so cocksure on this matter is that nautical astronomy or celestial navigation is pretty much the same today as the past century. Most sciences are scarcely recognizable after a few decades but celestial navigation is pretty much the same today as when Dewey sailed into Manila Bay. (We are not talking about purely instrumental improvements now). True, Nathaniel Bowditch with his longitudes by lunar distances and the moons of Jupiter is definitely out. But many mariners still go through the bootstrap-raising procedure of finding their latitude from a meridian altitude of the Sun, which is later used to get the longitude by a time sight, which is later used to calculate when the Sun will be on the meridian again. Modern celestial navigation had its birth just a century ago this year, and perhaps Astounding is as good a place to start calling attention to the fact as any.

In the same way that aërial navigation has taken and adapted to its own special uses the methods of surface navigation, so undoubtedly space pilots will borrow heavily from substratosphere flight. Hence, perhaps a few words as to how position is determined upon the Earth may be advisable. The principle of modern navigation is fortunately very easy to grasp—so easy that after a little practice you can locate your own back yard within a few hundred miles from the stars. Most of the great discoveries of science are hatched quietly in the laboratory or study after years of patient note taking and experimentation. The line of position, on the contrary, sprang full-grown from the elements, an offspring of the lightning and tempest.

The dramatic details follow, and the reader's indulgence is asked if the nautical phraseology misses occasionally.

On November 25, 1837, Captain Thomas H. Sumner, an American shipmaster, set sail from Charleston, South Carolina, bound for Greenock, England. Heavy gales from the westward had promised a quick passage. But after passing the Azores the wind prevailed to the southward with thick weather, making observations impossible until soundings indicated the presence of land. About midnight on December 17th they arrived within forty miles by dead reckoning off the Irish coast. At dawn no land was yet in sight but about 10 a. m. the clouds broke for a few minutes permitting time for an altitude of the Sun to be taken.

Now a single altitude of the Sun cannot be used to get your longitude unless you already know your latitude. Captain Sumner had gone so long without observations, however, that he was well aware his latitude by dead reckoning was likely in serious error. But as the storm increased in violence he at last decided in des-

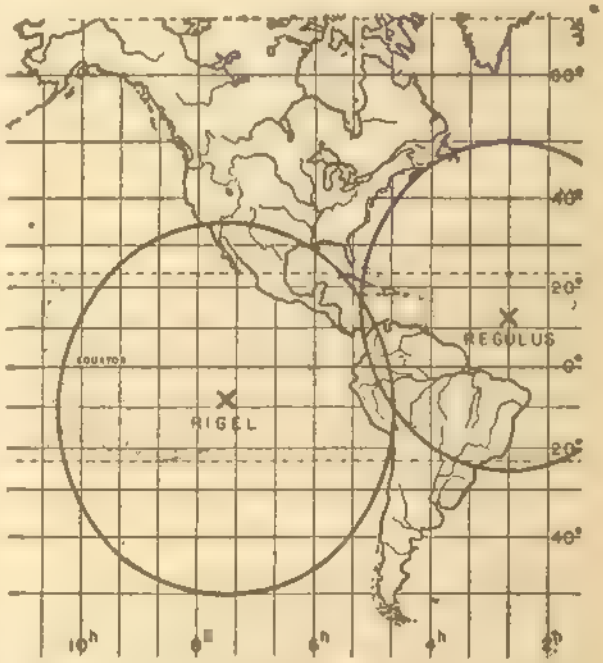



Figure 2. Circles of position from observations of two stars. The substellar points are indicated by crosses. The position of the ship was latitude 17° N, longitude 5 hours 10 minutes west. The position in South America indicated by the other intersection was obviously not that of the ship. The circles are slightly distorted because they are drawn on a projection map rather than on a world globe.

peration to take a chance and use it anyhow. Applying the formulas in the usual way he got a longitude fifteen miles east of his D. R. position. Next he simply *assumed* two latitudes ten miles to the north of his D. R. position and toward the danger. The remarkable fact emerged that when these three points were plotted upon a chart they fell upon a straight line that passed through Small's Light. Fig. I.

"It then became at once apparent that the observed altitude must have happened at all three points on the chart, at Small's Light, and the ship, at the same instant."

Thus, although Captain Sumner did not know his absolute position, he did know that his ship was somewhere upon this line, and if he could continue upon it he would eventually reach Small's Light. Setting his course accordingly, Small's Light hove in sight in less than an hour. Later he found that if the D. R. latitude alone had been used the result would probably have been disastrous.

The significant feature about Captain Sumner's discovery—which for some reason he did not get around to publishing until six years later in 1843—is that when you measure an altitude of a star it puts you somewhere upon *a line* and not merely at a *point*. Suppose you had a chart giving the position of a buried treasure. "The gold is buried eighty rods from the old mill down by the graveyard and seventy rods from the blasted oak across the way." With no other information for guidance a large scale program of excavation would appear to be necessary to locate the gold. But a little reflection will show that actually its position is quite definitely fixed. For if a circle is drawn around the old mill with a radius of eighty rods and another around the blasted oak with a radius of seventy rods, they will cross at two points. These two points are the only ones that satisfy all the given conditions; namely, they are both eighty rods from the mill and seventy rods from the oak tree. Therefore, the treasure *must* be under one of them. (See how long it takes your friends to figure this out.)

Whenever you measure the altitude of a star it puts you somewhere upon a vast circle which is centered around that point on the Earth where the star is directly overhead—the substellar point. Measure the altitude of another star and it puts you on a second circle that will always intersect the other at two places. Since a navigator always knows his position within about twenty miles or so by D. R. he is never in doubt as to which point to choose.

The simplest way to locate yourself by means of star circles would be to draw them directly onto the surface of a large globe and see where they cross. But keeping a large globe always handy might be somewhat awkward especially within the narrow confines of a bomber. Besides a navigator in the Bering Sea has but an academic interest at most in that portion of his circle of position that passes through the Caroline Islands, for example. The navigator always knows his position approximately so that the only portion of the circle that concerns him is the exceedingly short section of it in his immediate vicinity. An arc of only a few miles can be replaced with all the accuracy necessary by a straight line. Where two such lines cross gives him his "fix."

A navigator on his way from Dutch Harbor for Tokyo would determine these lines in what at first seems like a curiously roundabout sort of way. After selecting a suitable star for observation he picks out a point not too far away with a latitude and longitude that will fit neatly into his tables without having to bother over interpolating between numbers. (Always a messy operation even under the best of conditions.) His tables tell him what the altitude of this star would be if observed from that particular point. Then he maneuvers the bubble in his aircraft octant into position and actually measures its altitude. The difference between the hypothetical altitude and the observed altitude tells him how far off he is from his assumed position.

So much for the determination of position upon a planet. Now let us ponder upon the determination of position between planets. How to get a space fix, in other words.

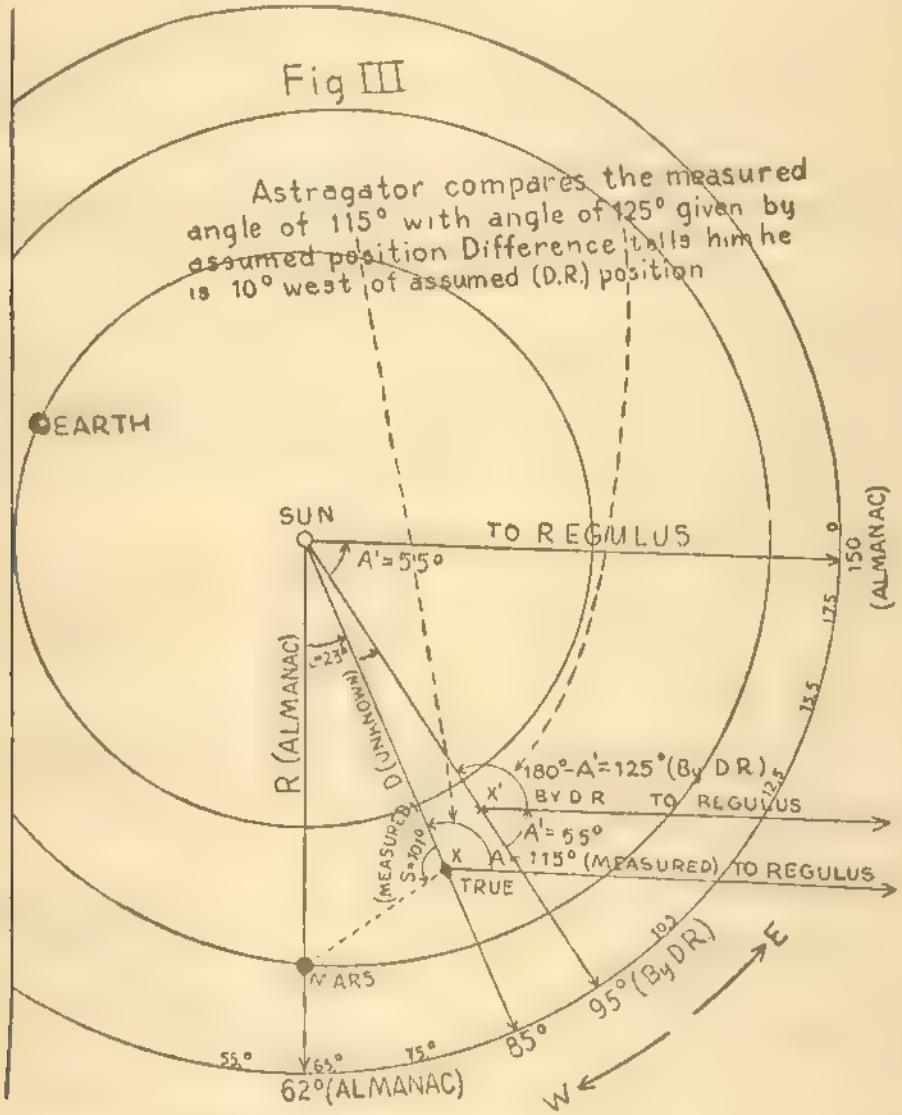
When the writer innocently began to meditate upon this question he was wholly unaware that anyone before him had ever given such matters really serious consideration. Quite by accident he came across a most interesting book by P. E. Cleator* which contained references to numerous highly technical treatises on space travel one of which ran into nine volumes of two hundred pages each! Unfortunately or otherwise for interplanetary enthusiasts in this country, the subject seems to

* "Rockets Through Space," Simon and Schuster.

have been developed almost exclusively by Russians, Germans, French, and Italians who have taken care to see that their published works are safe from the prying eyes of the laymen. Judging from Mr. Cleator's account, however, practically nothing has been done toward the specific problem of fixing position in space. Thus he writes on Page 106: "Determining the exact location of a spaceship in space, even on a lunar journey, will entail complicated calculations based on the movements of the planets against the background of the so-called fixed stars."

This is exactly opposite to the conclusion the writer had arrived at, as it would seem to be a comparatively easy job to get a fix in space by calculations no more complicated than many student navigators are doubtless performing right now. On the old principle that fools rush in and et cetera, the following is offered without copyright for the advancement of extra-terrestrial flight.

One fact immediately evident to the most casual observer is that interplanetary travel is going to be confined almost exclusively to one plane—the plane of the Earth's orbit. All the planets except Mercury revolve in very nearly the same plane and since it is a minor complication that can be easily corrected in practice, let us begin by assuming that the planets never deviate from the plane of the



Earth's orbit. A spaceship will then seldom have occasion to dip much above or below this level unless it be to avoid the zone of asteroids or take a side trip to one such as Hidalgo whose orbit is cocked up at an angle of forty-three degrees to it.

On this basis only two quantities would seem to be needed in order to locate an object anywhere within the solar system: (1), its distance from the Sun; (2), the angle at the object between the Sun and some fixed direction in space. The last may be an imaginary point like the vernal equinox which astronomers use so much, or for practical purposes of measurement a bright star such as Regulus which happens to coincide almost exactly with the plane of the solar system. No instruments would be necessary beyond an ordinary spring-wound chronometer, a device for measuring angles similar to the present bubble sextant used by aërial navigators, and a Space Almanac. One sight on a star for longitude and another on a planet for distance should be enough to turn the trick.

Just as a navigator either by sea or air always knows his position approximately, so the astragator will undoubtedly have some means of keeping track of his whereabouts and use it as a sort of springboard or jumping-off place for the determination of a fix in space. There are several ways of approaching the problem but the following would seem to be the simplest and most natural from the astragator's point of view. Here is a typical example stated in Captain Bowditch's best style:

"In space, on February 9, 5347 at 0645 in D. R. Long. 95°, Dist. 1.125 A. U. Took simultaneous sights on Sun and Regulus, ang. dist. 115°; and Sun and Mars, ang. dist. 101°. What was ship's position?"

First it should be emphasized that Regulus simply gives us a *direction* in space. The star is so tremendously far away that any two lines drawn from within the solar system toward it are for all practical purposes parallel. Thus a star which is virtually at infinity serves to orient the ship in longitude, or get it located in space in the right direction from the Sun.

Look at the diagram Fig. III which shows the true position of the ship at X and the supposed or D. R. position at X'. (The error in D. R. is enormously exaggerated for purposes of illustration.)

If the spaceship actually were at X', then the angle A' between the longitude of the ship and the longitude of Regulus, would equal the angle at the Sun between the ship and Regulus. The astragator cannot measure the angle A' since there is no tangible object in space that marks his longitude. But it is possible for him to measure the angle between the Sun and Regulus and by subtraction from 180° get the difference in longitude between Regulus and himself.

The astragator looks up the longitude of Regulus in his list of fifty-five astragational stars and finds it to be 150°. His longitude by D. R. is 95°. Hence the difference in longitude between Regulus and himself should be 150° less 95° or 55°. Which means that the angle he can measure should be 180° less 55° or 125°.

But as stated in the problem this angle is not 125° but 115° instead—10° less than the value given by D. R.

Now it must be pretty obvious simply from an inspection of the diagram that under the circumstances if the angle measured between the Sun and Regulus comes out *smaller* than the D. R. value, the ship must be *west* of the assumed position. (For example, if the D. R. position were so far off that it put the ship on the line drawn from the Sun toward Regulus the measured angle would be 180°. This would make the ship 180° less 115° or 65° to the west of the D. R. position.)

Therefore, the astragator knows that he is somewhere on a line 10° to the west of where he thought he was, or in longitude 85° and not 95°. He has now determined his direction from the Sun, but still is in the dark as to his distance from the Sun. His next step is to find this quantity.

He does this by taking a sight on some body within the solar system whose position is accurately known. In this case, Mars happens to be conveniently located for a shot. He measures the angle between the Sun and Mars of 101°. From the almanac he finds the distance of Mars for that date is 1.5 A. U. and its longitude 62°. Since he has just found his own longitude, the angle at the Sun between himself and Mars must be 85° less 62° or 23°.

Thus in the Space Triangle—Planet-Sun-Ship—he knows one side and all the angles which enables him immediately to solve for his own distance, D. It turns out to be 1.26 A. U., almost exactly midway between orbits of the Earth and Mars.

It should not be supposed that "solving" the Space Triangle means putting figures into trigonometric formulas. Instead the astragator will probably press a few buttons on some mechanical contrivance and watch the answer pop into sight. Celestial navigation demands solution of the so-called "Astronomical Triangle," and in the days of Moby Dick doubtless many sturdy sailors had their lives shortened more by their struggles with this three-cornered object than by the old devil sea. The latest tables issued by the Hydrographic Office —H. O. 214—now makes the solution of the Astronomical Triangle almost entirely *operational*, as easy as dialing a telephone number.

The accuracy of much marine navigation is illustrated by the old story of how third mates after careful measurement put a dot on the chart that marks the ship's position. Second mates draw a circle around the dot. Mates surround the circle with a free-hand sweep. And the captain lays his hand over the circle and says, "Somewhere in here!"

If skippers in the past have had trouble staying upon their course, imagine them confronted by a nice little exercise in celestial mechanics involving the relative positions of their ship, Sun, and a couple of planets. In the stories, spacecraft seem to proceed from one point to another by some process of reckoning such as spinning the bottle or cutting a deck of cards. Seldom does there appear to be anyone on board who could conceivably solve Kepler's equation, either drunk or sober. Yet this is exactly the sort of knowledge anyone will need who plans to do much roving around our solar system.

What might be termed the classical method of reaching Mars—or any planet for that matter—sounds so easy on paper that one tingles all over to get started on the trip. Perhaps you have been laboring all these years under the delusion that we can never hope to build a cannon big enough to send a projectile to Mars. Nonsense! The Big Bertha the Germans used in 1918 was capable theoretically not merely of sending a projectile to Paris but all the way to the Red Planet as well.*

The main requirement in interplanetary communication either by projectile or rocket is to make sure you have put yourself in the right orbit at the start of the journey. For once under way the rest is easy. You simply shut off the engine, light your pipe, and let the force of gravitation do the rest. Much space travel will probably be done by a kind of transorbital coasting or free-wheeling process. A spaceship bound from Greenland, Earth to Sabaeus Sinus, Mars, should be regarded more as a minor planet following an orbit imposed upon it, not by some primordial cataclysm, but rather by some young navigator with a wife and two children and a down payment on a new stratosphere sedan coupé.

This conception of a spaceship as an asteroid should be clearly kept in mind. So long as the motors are inactive the ship would move in the orbit selected for it as obediently as if it had been following that route for the last hundred million years. Just because it is passing through unresisting space does not mean that its motion is uniform, however. As it recedes from the Sun its speed gradually decreases until the aphelion point is attained. Then it heads Sunward again at an ever-increasing rate. Unless the ship should chance to make a *very* close approach to a planet, the Sun is always the absolute master.

In routing a ship to a planet the two chief considerations are invariably: How much energy will be required and how long will it take? There are literally millions of paths that will lead a ship to Mars. Let us see how these two factors aid in the selection of a route, for some are much easier to follow than others.

Since Mars is exterior to the Earth, the projectile or rocket will have to force its way outward from the Sun—climb uphill so to speak—in order to get there. This means that at the take-off it must be moving faster than the Earth, otherwise it will never be able to make the grade. Now if you were making an urgent business trip by plane from San Francisco to Chicago, for example, you would hardly continue on to Cleveland or Detroit and then double back on yourself. Just so in aiming for Mars you try not to overshoot the mark but give yourself precisely the right impetus at the start to reach your destination and no more. Calculation shows that the minimum velocity required with respect to the Sun is 19.9 miles per second. (This will vary slightly depending upon what part of the orbit you attempt to reach.)

The Earth maintains a nearly constant pace in its orbit of 18.5 miles per second. In seeking to reach Mars with as little expenditure of energy as possible we would be foolish not to

*A detailed description is given by Willy Ley in Astounding for October, 1942, on page 50.

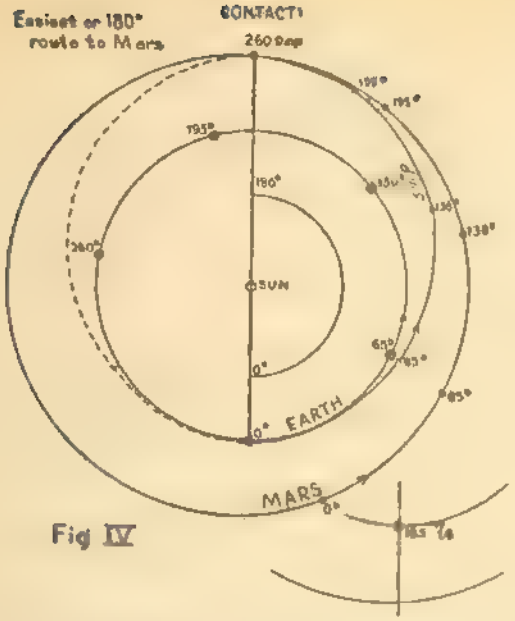


Fig IV

make use of the Earth's orbital motion which is already ours for nothing; in fact, we can hardly avoid it. That is, by launching the projectile in the same direction the Earth is headed we need only give it a sped of 1.4 miles per second in order to secure the total of 19.9 required. Also, by starting from the equator at midnight we can pick up an additional 0.3

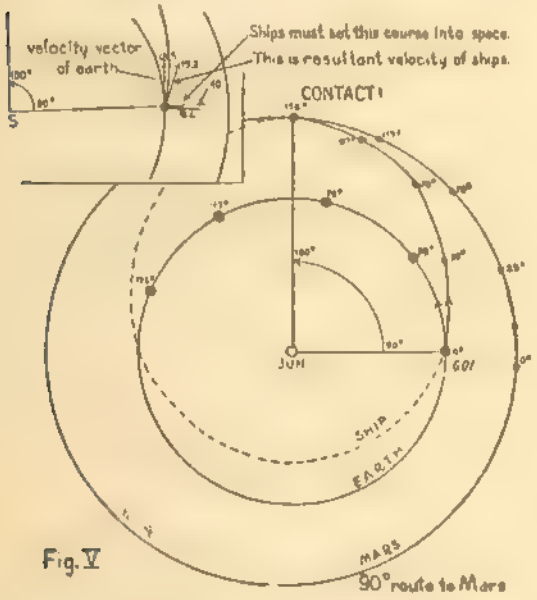


Fig. V

m.p.s. from the rotation of the Earth. Thus the shell or spaceship will depart this world at the comparatively moderate rate of a trifle over a mile per second—which was very nearly the muzzle velocity of the Big Bertha that shelled Paris—Fig. IV.

(We omit from discussion obstacles that arise through atmospheric resistance, force of surface attraction, et cetera, since such topics would seem to come more properly under the head of "Piloting" rather than "Astragation." The figures quoted here would have to be greatly modified if purely local planetary problems were included.)

Without going into the technical details in their entirety, Fig. IV shows the type of orbit

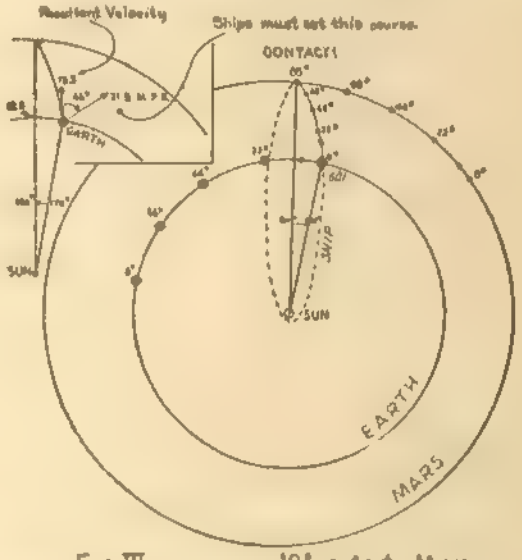
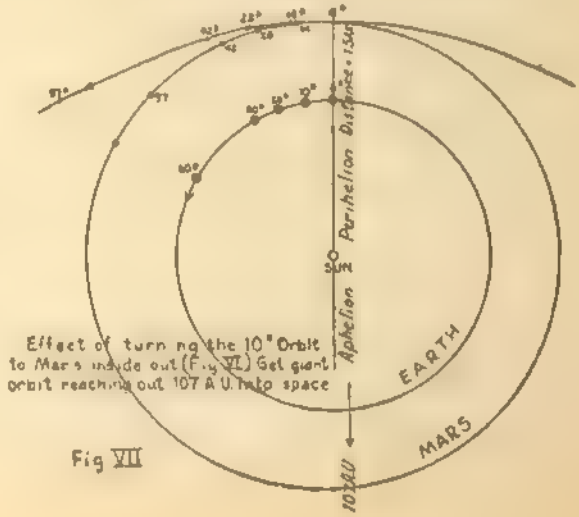


Fig VI 10° route to Mars

a spaceship would follow in order to reach Mars by the easiest or so-called 180° route. The name comes from the fact that departure takes place when the Earth is on the side of the Sun opposite or 180° from the point where contact is planned with Mars. Only by shooting off along a tangent in this way can the ship acquire all of the Earth's orbital motion.

To take the case out of the abstract, suppose that we wished to arrive at Mars when it was passing the perihelion point of its orbit


Perihelion Distance 1.381
Aphelion
Effect of turning the 10° Orbit to Mars inside out (Fig VI) Get giant orbit reaching out 107 A.U. into space
EARTH
MARS
10 A.U.
Fig VII

on September 17, 1939 at twelve o'clock noon, Central Standard Time. In order to leave when the Earth is 180° from this point the passengers must be all aboard on February 24, 1939.

All right. It is now February 24, 1939. Here we go!

At the start Mars is some one hundred twenty-nine million miles ahead but the ship rapidly cuts the distance down. By March 23rd it is reduced to one hundred two million, by April 24th to seventy-four million, and on July 10th they are separated by a mere thirty-nine million miles. And on September 17th as the passengers are preparing to disembark the steward regretfully announces that they have—missed! By thirty-nine million miles! The ship made the perihelion point all right but Mars was forty-two million miles farther east at that moment.

This blunder was done purposely to emphasize the obvious fact which most popular writers for some reason more or less ignore, that although there is no trouble in calculating exactly when to leave in order to reach any point on the *orbit* of Mars at a set time, this implies no obligation whatever on the part of the *planet* Mars to oblige by being there at that time. Before a ship can be given the green light, the dispatcher must make sure its orbit properly coincides with the positions of the Earth and Mars or else it will fail to make connection at the other end of the line. Thus in the example just cited, although the ship missed badly by starting on February 24th, investigation shows that by trying successively later dates it could have gotten onto a true collision course if departure had been delayed until May 8th. The ship would then have gotten to Mars by January 14, 1940, two hundred fifty-one days later. Astronomical data are sufficiently precise so that the time of transit could be determined to within about an hour if necessary, but it is doubtful if schedules will be tabulated closer than about twelve hours since the last few hundred thousand miles will have to be done by piloting anyhow.

The minimum energy 180° route is the only one generally considered in most popular articles. But if space travel is going to be limited to a few favorable cases the arrival of a ship from Mars or Venus will be an occasion for a public demonstration, as rare as the pack boat from San Francisco to Pago Pago. Somehow this does not fit in with our picture of transportation in the year 5943 A. D.

Recently commentators have begun to speak of the "new important great circle" airplanes are opening up across the pole from New York to Chunkiang, Tokyo, and Murmansk. Similarly, there are other possible paths between worlds besides those that require the least effort to follow.

The bigger the angle between the direction the Earth is moving and the direction the ship takes off for Mars, the more energy—or what amounts to the same thing—the more money it is going to take to make the trip. As already explained, this is because we are using less of the Earth's motion which is free and expending more of our own which is apt to be very costly. But does anyone doubt that the day will come when the value of an enterprise is reckoned in terms of human necessity rather than such meaningless symbols as $10,000,000 or $100,000,000 or $1,000,000,000? Let us therefore feel no hesitation about running up a bill on future generations, payable promptly after the first one thousand years.

It can be safely predicted, however, that in terms of whatever passes for money in 5943, it is going to cost plenty for every day that is pared off the 180° route to Mars. Suppose now that instead of giving Mars a handicap of 180°, we cut the lead down to 90°, and successively smaller angles. How much energy will be needed and how many days will be saved?

Fig. V shows the kind of orbit the ship would follow by the 90° route. It is slightly more elongated than the other and instead of being entirely outside the orbit of the Earth about forty percent falls inside. The time of transit is cut down from two hundred sixty days to one hundred fifty-six days, a saving of forty percent. The ship must leave with a speed of 6.2 m.p.s. relative to the surface and head out an angle of 94° with the direction the Earth moves. If we assume that the amount of energy required depends roughly upon the square of the initial velocity, then Mars via 90° is thirty-two hundred per cent more expensive than by way of 180°. The reason is perfectly plain. Before we worked with the Earth in its motion; here we work nearly at right angles to it. In fact, we have to set a course which is actually 4° opposite to the Earth's orbital velocity, or fire 4° backward, as it were.

Note the parallel between a plane taking off a carrier into the wind and a spaceship leaving the Earth for another planet. The plane

sets a course such that its own speed together with that of the wind will combine to produce a resultant motion toward the objective. Similarly, the spaceship takes off at such an angle that its own speed combined with that of the Earth puts it into the desired orbit. From this point of view the motion of the Earth may be regarded as a steady wind blowing at the rate of 18.5 m.p.s. from the west.

Now let us put the starting point closer and closer to the position of Mars in its orbit. Let us give Mars a handicap of 80°, 70°, 60°—with respect to the Earth. The orbit the ship must follow is altered drastically as the angle decreases. From a casaba-shaped oval at 90° it collapses through various configurations resembling watermelons, cucumbers, torpedoes, et cetera, until at 10° we obtain a narrow cigar-like figure beyond which there would seem to be little point in pressing matters further. The journey to Mars by the 10° route takes but eighty-eight days. Reducing the angle farther does not appreciably reduce the time beyond a few hours. In fact, as the orbit approaches the limiting figure of a parabola there is an indication that it even increases appreciably.

The velocity of the ship with respect to the *Sun* or the velocity of the ship in its orbit in the 10° case is not so great as in the 180° and 90° cases; 15.3 m.p.s. as compared with 19.9 and 19.2. But the velocity of the ship with respect to the *Earth* is vastly greater: 21.5 m.p.s. as compared with 1.1 and 6.2. The ship gets practically no help from the Earth at all, for it must set a course at an angle of 136° to the Earth's velocity, or 46° in a direction opposite to the motion of the Earth.

To reach Mars by the 10° route would be for multimillionaires only, for it would be twelve times more expensive than by 90° and three hundred eighty-two times more than by

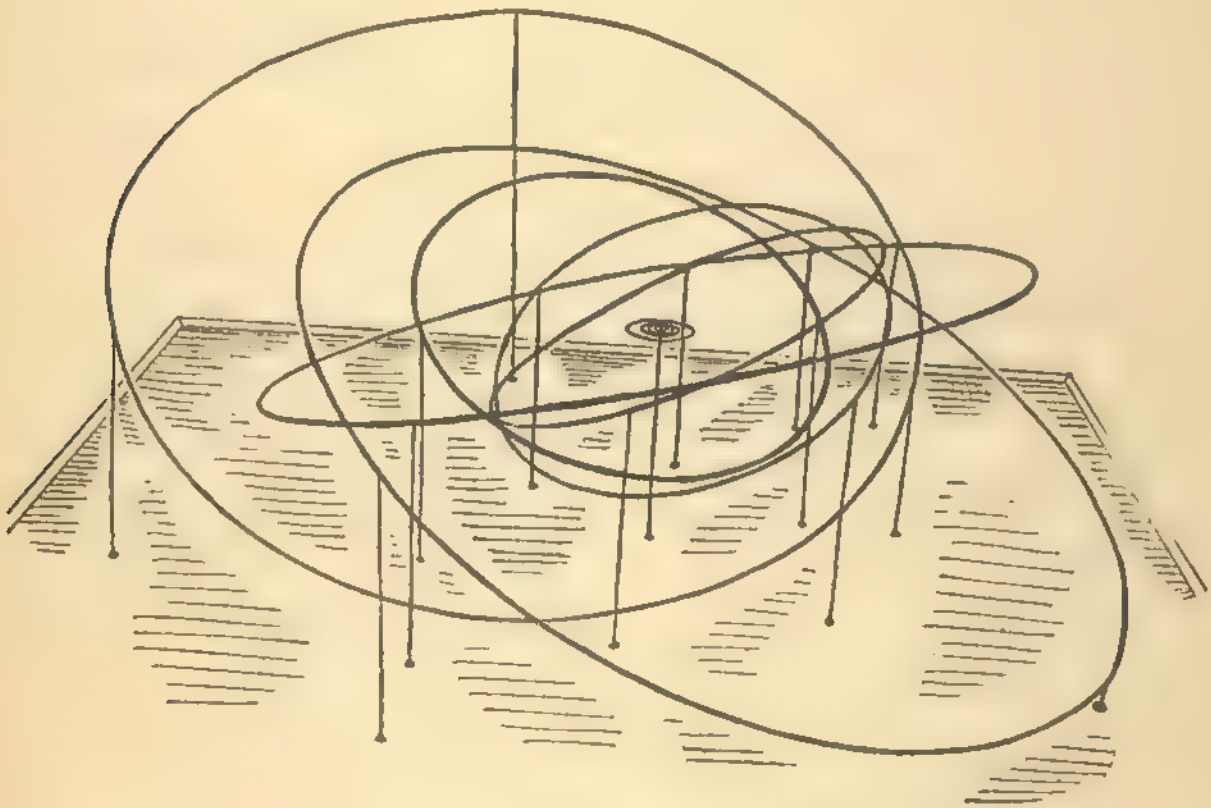


***FIG. VIII.*** *Model showing satellite system of Jupiter in perspective. After penetrating six outer orbits would come to the four large Galilean satellites and close inner moon (Jup V). Since five inner satellites revolve in plane of Jovian equator could most easily avoid by landing in high latitude. Rod supporting inner satellites points "up" or toward the north pole of the ecliptic.*

180°. If space travel is to be made available to people of moderate means as we understand this term now, parity will have to be fixed at around 0.0001 cent per mile. The longest journey by way of 180° covers three hundred thirty-eight million miles. At this rate a round-trip ticket would cost six hundred seventy-six dollars. But by the 10° route, although the distance is reduced to fifty million miles, the greater energy needed would boost the price up to thirty-eight thousand dollars, or two hundred fifteen dollars per day for mileage alone.

These highly eccentric routes could be extremely hazardous in addition to being highly expensive. For suppose the driving mechanism failed to work when the time came to land on Mars. If contact could not be effected or the passengers and crew transferred to another ship by rescue squads, they are doomed to certain destruction. For one of the necessary consequences of choosing a greatly elongated orbit is that it forces you into the Sun at perihelion. In the 10° orbit the ship would whip around the Sun at a distance of two million miles and be speedily converted from a luxurious vehicle for interplanetary travel into a small comet with a strange spectrum composed of strong metallic lines together with a few faint bands of certain well-known carbon compounds.

It is fun to play with orbits sometimes. Force them to go in certain directions or make drastic alterations in the elements. Many of the orbits of newly discovered asteroids and comets are gradually brought under control by what astronomers have come to call a "cooking" process; that is, little changes are made here and there until the best fit possible with the observations is obtained.

Just for the devil of it suppose that we take this 10° orbit to Mars and *turn it inside out.* Not merely turn it end-for-end but force the perihelion point to become the aphelion point, and vice versa. The result is an orbit of exactly the same shape as before but instead of reaching only as far as Mars now extends out to nearly three times the distance of Pluto. The period of an object revolving in this orbit would be three hundred ninety-one years. A path such as a giant interstellar comet might follow—Fig. VII.

To travel inward from the Sun—to go from Mars to Earth or Earth to Venus—means that the ship must fall toward the Sun or travel more slowly than the planet it leaves behind. To lose energy might seem comparatively easy in contrast to the effort of gaining it, but such is not the case, as anyone who has ever fallen off a train could testify. To reach Venus by the 180° route the ship must move about 1.6 m.p.s. slower than the Earth. The ship therefore takes off in the opposite direction the Earth is moving with a speed of 1.6 miles per second. Thus to reach Venus takes practically the same amount of energy required for Mars. The journey is considerably shorter, however, only one hundred forty-six days in all.

When taking off from a planet the first consideration must always be its orbital velocity of revolution. But for a ship cruising far from any large mass it is questionable whether procedure from point to point should invariably be done by orbit with motors inactive. In many cases it would seem more practicable to take simply the most nearly direct route possible—the straight line.

Suppose a ship near the orbit of Mars receives orders to meet a convoy at a distance

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of one million five hundred thousand miles within twenty hours. Some energy would have to be spent in getting the ship turned around and headed in the right direction at the necessary speed. But once under way the motors could be cut off and the ship would continue on in a straight line toward the rendezvous position. The only sensible force acting upon it would be that of the Sun. At the end of twenty hours the ship would have fallen Sunward by five thousand miles and be off its course by 0.2°, scarcely enough to be of consequence. On a long voyage in the vicinity of Venus, however, the effect of the solar attraction might be more serious. In which case an occasional blast to Sunward should be sufficient to maintain a straight-line course.

When a ship begins to enter the outer satellite system or what might be called the suburbs of a planet it will be necessary to abandon strictly orbital motion and proceed by piloting. The ship will of course be aware of all satellites in that sector; nevertheless it will be advisable to exercise the greatest caution at all times. The diagram shows the tangled orbits of the six outer *known* satellites of Jupiter. Once these are safely penetrated the four large Galilean satellites and the speedy little fifth moon remain as distinct hazards. Fortunately they revolve in the plane of the planet's equator so that practically all risk would be eliminated by landing in a high latitude. The greatest danger would be to local traffic moving from one hemisphere to another—Fig. VIII.

But as will be shown in the next installment, other considerations make it very doubtful whether Jupiter and Saturn can ever be successfully colonized.

TO BE CONCLUDED.

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# IN TIMES TO COME

The April Astounding leads off with a yarn by Raymond F. Jones called "Swimming Lesson." Based on that old, well-known quick method for teaching a man to swim. Just heave him in the water where it's well over his head, fairly calm, and of the usual wetness. And on a philosophy, an observed fact of human psychology; people are the stupidest dopes. Once upon a time, back in 1929, everybody knew there would be no more depressions—and got kicked in the chin toward the end of that year. In 1935, most people knew war was outlawed, except in backward parts of the world, and would never bother us again. In 1939, a lot of us knew it wasn't *our* war—that *we* were safe. Uh-huh. Just pull your neck back in your shell, tuck your feet in carefully, and you'll be mistaken for a stone and nobody will bother you. Until the fire's hot and the water's ready for making turtle soup, at least.

The members of the scientist's foundation knew war was outlawed, and realized that the officers of the space military forces lived only for war, that when those men said Venus was preparing an attack with a new weapon, they were trying to justify their existence, not stating facts. Further, the weapon the said Venus had was impossible, anyway.

So they learned to swim—to fight that weapon—in the old-fashioned quick way—

The editorial next month needs mention here, too. Astounding undergoes another change, one I haven't space to describe here. You won't like it. We don't like it. Three guesses as to what three megalomaniacs are responsible for it. Full explanation in the April issue will be followed by the change-over beginning with the May number.

THE EDITOR.

# Q. U. R.

## By H. H. Holmes

***THIS*** *is a robot story. It is also a wacky story, about the general insanity of robots—of the kind people tend to think of when the word "robot" is mentioned.*

Illustrated by Fax

It's got so the young sprouts nowadays seem never to have heard of androids. Oh, they look at them in museums and they read the references to them in the literature of the time, but they never seem to realize how essential a part of life androids once were, how our whole civilization, in fact, depended on them. And when you say you got your start in life as trouble shooter for an android factory, they look at you as though you'd worked in two-dimensional shows way back before the sollies, as though you ought to be in a museum yourself.

Now I'll admit I'm no infant. I'll never see a hundred again. But I'm no antique either. And I think it's a crying shame that the rising generation is so completely out of touch with the last century. Not that I ever intended to be writing my memoirs; I didn't exactly construct my life to that end. But somebody's got to tell the real story of what androids meant and how they ceased to mean it. And I'm the man to tell it, because I'm the man who discovered Dugg Quinby.

Yes, I said Quinby. Dugglesmarther H. Quinby, the Q. in Q. U. R.. The man who made your life run the way it does today. And I found him.

That summer was a hell of a season for a trouble shooter for androids. There was nothing but trouble. My five-hour day stretched to eight, and even ten and twelve while I dashed all over New Washington checking on one android after another that had cracked up. And maybe you know how hot the Metropolitan District gets in summer, even worse than the rest of Oklahoma.

Because my job wasn't one that you could carry on comfortably in conditioned buildings and streets, it meant going outside and top side and everywhere that a robot might work. We called the androids robots then. We hadn't conceived of any kind of robot that wasn't an android or at least a naturoid of some sort.

And these breakdowns were striking everywhere, hitting robots in every line of activity. Even the Martoids and Veneroids that some ex-colonists fancied for servants. It would be an arm that went limp or a leg that crumpled up or a tentacle that collapsed. Some-

times mental trouble, too, slight indications of a tendency toward insubordination, even a sort of mania that wasn't supposed to be in their make-up. And the thing kept spreading and getting worse. Any manifestation like this among living beings, and you'd think of an epidemic. But what germ could attack tempered duralite?

The worst of it was there was nothing wrong with them. Nothing that I could find, and to me that meant plain nothing. You don't get to be head trouble shooter of Robinc if anything can get past you. And the second worst was that it was hitting my own staff. I had had six robots under me—plenty to cover the usual normal amount of trouble. Now I had two, and I needed forty.

So all in all I wasn't happy that afternoon. It didn't make me any happier to see a crowd in front of the Sunspot engaged in the merry pastime of Venusian-baiting. It was never safe for one of the little green fellows to venture out of the Venusian ghetto; this sport was way too common a spectacle.

They'd got his vapor inhalator away from him. That was all there was to the game, but that was enough. No extra-physical torment was needed. There the poor giller lay on the sidewalk, sprawled and gasping like a fish out of water, which he practically was. The men—factory executives mostly, and a few office foremen—made a circle around him and laughed. There was supposed to be something hilariously funny about the struggles of a giller drowning in air, though I never could see it myself.

Oh, they'd give him back his inhalator just in time. They never killed them off; the few Venusians around had their uses, particularly for repair work on the Veneroid robots that were used under water. But meanwhile there'd be some fun.

Despite the heat of the day, I shuddered a little. Then I crossed to the other side of the street. I couldn't watch the game. But I turned back when I heard one loud shout of fury.

That was when I found Dugg Quinby. That shout was the only sound he made. He was ragingly silent as he plowed through that mass of men, found the biggest of them, snatched the inhalator away from him, and restored it to its gasping owner. But there was noise enough from the others.

Ever try to take a bone from a dog? Or a cigar from a Martian mountaineer? Well, this was worse. Those boys objected to having their fun spoiled, and they expressed their objection forcibly.

I liked this young blond giant that had plowed in there. I liked him because his action had asked me what I was doing crossing over to the other side of the street, and I didn't have an answer. The only way even to try to answer was to cross back.

Androids or Q. U. R., single-drive spaceships or modern multiples, one thing that doesn't change much is a brawl, and this was a good one. I don't know who delivered the right that met my chin as I waded in, and I don't know who it was meant for, but it was just what I needed. Not straight enough to do more than daze me for a minute, but just hard enough to rouse my fighting spirit to the point of the hell with anything but finding targets for my knuckles. I avenged the Venusian, I avenged the blond youth, I avenged the heat of the day and the plague of the robots. I avenged my job and my corns and the hangover I had two weeks ago.

The first detail that comes clear is sitting inside the Sunspot I don't know how much later. The blond boy was with me, and so was one of the factory men. We all seemed to be the best of friends, and there wasn't any telling whose blood was which.

Guzub was beaming at us. When you know your Martians pretty well, you learn that that trick of shutting the middle eye is a beam. "You zure bolished 'em ub, boys," he gurgled.

The factory man felt of his neck and decided his head was still there. "Guzub," he declared, "I've learned me a lesson: From now on any green giller is safe around me."

"That'z the zbirid," Guzub glurked. "Avder all, we're all beings, ain'd we? Now wad'll id be?"

Guzub was hurt when the blond youth ordered milk, but delighted when the factory man said he'd have a Three Planet with a double shot of margil. I'm no teetotaler, but I don't go for these strong drinks; I stuck to my usual straight whiskey.

We exchanged names while we waited. Mike Warren, the factory man was; and the other —but then I tipped that off already. That was Quinby. They both knew me by name.

"So you're with Robinc," Mike said. "I want to have a talk with you about that sometime. My brother-in-law's got a new use for a robot that could make somebody, including

me, a pile of credits, and I can't get a hearing any place."

"Glad to," I said, not paying too much attention. Everybody's got a new use for a robot, just like writers tell me everybody's got a swell idea for a solly.

Dugg Quinby had been staring straight ahead of him and not listening. Now he said, "What I don't see is why?"

"Well," Mike began, "it seems like he was stuck once on the lunar desert and—"

"Uh-huh. Not that. What I don't see is why Venusians? Why we act that way about them, I mean. After all, they're more or less like us. They're featherless bipeds, pretty much on our general model. And we treat them like they weren't even beings. While Martians are a different shape of life altogether, but we don't have ghettos for them or Martian-baiting."

"That's just it," said Mike. "The gillers are too much like us. They're like a cartoon of us. We see them, and they're like a dirty joke on humans, and we see red. I mean," he added hastily, his hand rubbing his neck, "that's the way I used to feel. I was just trying to explain."

"Nuts," I said. "It's all a matter of historical parallel. We licked the pants—which they don't wear—off the Venusians in the First War of Conquest, so we feel we can push 'em around. The Second War of Conquest went sour on us and damned near put an end to the Empire and the race to boot, so we've got a healthy respect for the Martians." I looked over at the bartender, his tentacles industriously plying an impressive array of bottles and a gleaming duralite shaker. "We only persecute the ones it's safe to persecute."

Quinby frowned. "It's bad enough to do what no being ought to do, but to do it only when you know you can get away with it—I've been reading," he announced abruptly, as though it was a challenge to another fight.

Mike grunted. "Sollies and telecasts are enough for a man, I always say. You get to reading and you get mixed up."

"Do you think you aren't mixed up without it? Do you think you aren't all mixed up? If people would only try to look at things straight—"

"What have you been reading?" I asked.

"Old stuff. Dating, oh I guess, a millennium or so back. There were people then that used to write a lot about the Brotherhood of Man. They said good things. And it all means something to us now if you translate it into the Brotherhood of Beings. Man is unified now, but what's the result? The doctrine of Terrene Supremacy."

Guzub brought the drinks and we forked out our credits. When he heard the phrase "Terrene Supremacy" his left eyelid went into that little quiver that is the Martian expression of polite incredulity, but he said nothing.

Quinby picked up his milk. "It's all because nobody looks at things straight. Everybody looks around the corners of his own prejudices. If you look at a problem straight, there isn't a problem. That's what I'm trying to do," he said with that earnestness you never come back to after youth. "I'm trying to train myself to look straight."

"So there isn't a problem. No problems at all." I thought of the day I'd had and the jobs still ahead of me and I snorted. And then I had an idea and calmly, between swallows of whiskey, changed the course of terrene civilization. "I've got problems," I asserted. "How'd you like to look straight at them? Are you working now?"

"I'm in my free-lance period," he said. "I've finished technical college and I'm not due for my final occupational analysis for another year."

"All right," I said. "How's about it?"

Slowly he nodded.

"If you can look," said Mike, wobbling his neck, "as straight as you can hit—"

I was back in my office when the call came from the airport. I'd seen Thuringer's face red before, but never purple. He had trouble speaking, but he finally spluttered out, "Somebody did a lousy job of sterilization on your new assistant's parents."

"What seems to be the trouble?" I asked in my soothingest manner.

"Trouble! The man's lunatic stock. Not a doubt. When you see what he's done to—" He shuddered. He reached out to switch the ike-range, but changed his mind. "Uh-huh. Come over here and see it for yourself. You wouldn't believe it. But come quick, before I go and apply for sterilization myself."

We had a special private tube to the space port; they used so many of our robots. It took me less than five minutes to get there. A robot parked my bus and another robot took me up in the lift. It was a relief to see two in good working order, though I noticed that the second one showed signs of incipient

limpness in his left arm. Since he ran the lift with his right, it didn't really matter, but Robine had principles of perfection.

Thuringer's robot secretary said, "Tower room," and I went on up. The space-port manager scanned me and gave the click that meant the beam was on. The tower door opened as I walked in.

I don't know what I'd expected to see. I couldn't imagine what would get the hard-boiled Thuringer into such a blasting dither. This had been the first job that I'd tried Quinby out on, and a routine piece of work it was, or should have been, Routine, that is, in these damnable times. The robot which operated the signal tower had gone limp in the legs and one arm. He'd been quoted as saying some pretty strange things on the beam, too. Backsass to pilots and insubordinate mutterings.

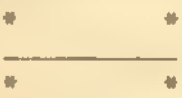
The first thing I saw was a neat pile of scrap in the middle of the room. Some of it looked like robot parts. The next thing I saw was Thuringer, who had gone from purple to a kind of rosy black. "It's getting me!" he burst out. "I sit here and watch it and I'm going mad! Do something, man! Then go out and annihilate your assistant, but do something first!"

I looked where he pointed. I'd been in this tower control room before. The panel had a mike and an ike, a speaker and a viewer, and

a set of directional lights. In front of it there used to be a chair where the robot sat, talking on the beam and watching the indicators.

Now there was no chair. And no robot. There was a table, and on the table was a box. And from that box there extended one arm, which was alive. That arm punched regularly and correctly at the lights, and out of the box there issued the familiar guiding voice.

I walked around and got a gander at the front of the box. It had eyes and a mouth and a couple of holes that it took me a minute to spot as ear holes. It was like a line with two dots above and two below it, so:



It was like no face that ever was in nature, but it could obviously see and hear and talk.

Thuringer moaned. "And that's what you call a repair job! My beautiful robot! Your A-1-A Double Prime All-Utility Extra-Quality De-Luxe Model! Nothing of him left but this"—he pointed at the box—"and this"—he gestured sadly at the scrap heap.

I looked a long time at the box and I scratched my head. "He works, doesn't he?"

"Works? What? Oh, works."

"You've been here watching him. He pushes the right lights? He gets messages right? He gives the right instructions?"

"Oh yes. I suppose so. Yes, he works all right. But damn it, man, he's not a robot any more. You've ruined him."

The box interrupted its beam work. "Ruined hell," it said in the same toneless voice. "I never felt so good since I was animated. Thanks, boss."

Thuringer goggled. I started to leave the room.

"Where are you going? Are you going to make this right? I demand another A-1-A Double Prime at once, you understand. And I trust you'll kill that assistant."

"Kill him? I'm going to kiss him."

"Why, you—" He'd picked up quite a vocabulary when he ran the space port at Venusberg. "I'll see that you're fired from Robinc tomorrow!"

"I quit today," I said. "One minute ago."

That was the birth of Q. U. R.

I found Quinby at the next place on the list I'd given him. This was a job repairing a household servant—one of the Class B androids with a pretty finish, but not up to commercial specifications.

I gawped when I saw the servant. Instead of two arms he had four tentacles, which he was flexing intently.

Quinby was packing away his repair kit. He looked up at me, smiling. "It was very simple," he said. "He'd seen Martoid robots at work, and he realized that flexible tentacles would be much more useful than jointed arms for housework. The more he brooded about it, the clumsier his arms got. But it's all right now, isn't it?"

"Fine, boss," said the servant. He seemed to be reveling in the free pleasure of those tentacles.

"There were some Martoid spares in the kit," Quinby explained, "and when I switched the circuit a little—"

"Have you stopped," I interposed, "to think what that housewife is going to say when she comes home and finds her servant waving Martoid tentacles at her?"

"Why, no. You think she'd—"

"Look at it straight," I said. "She's going to join the procession demanding that I be fired from Robinc. But don't let it worry you. Robinc's nothing to us. From now on we're ourselves. We're Us Incorporated. Come on back to the Sunspot and we'll thrash this out."

"Thanks, boss," the semi-Martoid called after us, happily writhing.

I recklessly ordered a Three Planet. This was an occasion. Quinby stuck to milk. Guzub shrugged—that is, he wrinkled his skin where shoulders might have been on his circular body—and said, "You loog abby, boys. Good news?

I nodded. "Best yet, Guzub. You're dishing 'em up for an historic occasion. Make a note."

"Lazd dime you zelebrade izdorig oggazion," said Guzub resignedly, "you breag zevendy-vour glazzes. Wy zhould I maig a node?"

"This is different, Guz. Now," I said to Quinby, "tell me how you got this unbelievable idea of repair?"

"Why, isn't it obvious?" he asked simply. "When Zwergenhaus invented the first robot, he wasn't thinking functionally. He was trying to make a mechanical man. He did, and he made a good job of it. But that's silly. Man isn't a functionally useful animal. There's very little he can do himself. What's made

him top dog is that he can invent and use tools to do what needs doing. But why make his mechanical servants as helplessly constructed as he is?

"Almost every robot, except perhaps a few like farmhands, does only one or two things and does those things constantly. All right. Shape them so that they can best do just those things, with no parts left over. Give them a brain, eyes and ears to receive commands, and whatever organs they need for their work.

"There's the source of your whole robot epidemic. They were all burdened down with things they didn't need—legs when their job was a sedentary one, two arms when they used only one—or else, like my house servant, their organs were designed to imitate man's rather than to be ideally functional. Result: the unused waste parts atrophied, and the robots became physically sick, sometimes mentally as well because they were tortured by unrealized potentialities. It was simple enough, once you looked at it straight."

The drinks came. I went at the Three Planets cautiously. You know the formula: one part Terrene rum—170 proof—one part Venusian margil, and a dash or so of Martian vuzd. It's smooth and murderous. I'd never tasted one as smooth as this of Guzub's, and I feared it'd be that much the more murderous.

"You know something of the history of motor transportation?" Quinby went on. "Look at the twentieth century models in the museum sometime. See how long they kept trying to make a horseless carriage look like a carriage for horses. We've been making the same mistake—trying to make a manless body look like the bodies of men."

"Son," I said—he was maybe five or ten years younger than I was—"there's something in this looking-straight business of yours. There's so much, in fact, that I wonder if even you realize how much. Are you aware that if we go at this right we can damned near wipe Robinc out of existence?"

He choked on his milk. "You mean," he ventured, slowly and dreamily, "we could—"

"But it can't be done overnight. People are used to android robots. It's the only kind they ever think of. They'll be scared of your unhuman-looking contraptions, just like Thuringer was scared. We've got to build into this gradually. Lots of publicity. Lots of promotion. Articles, lectures, debates. Give 'em a name. A good name. Keep robots; that common domain, I read somewheres, because it comes out of a play written a long time ago in some dialect of Old Slavic. Quinby's Something Robots—"

"Functionoid?"

"Sounds too much like fungoid. Don't like. Let me see—" I took some more Three Planets. "I've got it. Usuform. Quinby's Usuform Robots. Q. U. R."

Quinby grinned. "I like it. But shouldn't it be your name too?"

"Me, I'll take a cut on the credits. I don't like my name much. Now what we ought to do is introduce it with a new robot. One that can do something no android in the Robinc stock can tackle—"

Guzub called my name. "Man ere looking vor you."

It was Mike. "Hi, mister," he said. "I was wondering did you maybe have a minute to listen to my brother-in-law's idea. You remember, about that new kind of robot—"

"Hey, Guzub," I yelled. "Two more Three Planets."

"Make it three," said Quinby quietly.

We talked all the rest of that night. When the Sunspot closed at twenty-three—we were going through one of our cyclic periods of blue laws then—we moved to my apartment and kept at it until we fell asleep from sheer exhaustion, scattered over my furniture.

Qinby's one drink—he stopped there—was just enough to stimulate him to seeing straighter than ever. He took something under one minute to visualize completely the possibilities of Mike's contribution.

This brother-in-law was a folklore hobbyist, and had been reading up on the ancient notion of dowsing. He had realized at once that there could have been no particular virtue in the forked witch-hazel rod which was supposed to locate water in the earth, but that certain individuals must have been able to perceive that water in some *n*th-sensory manner, communicating this reaction subconsciously to the rod in their hands.

To train that *n*th sense in a human being was probably impossible; it was most likely the result of a chance mutation. But you could attempt to develop it in a robot brain by experimentation with the patterns of the sense-perception tracks; and he had succeeded. He could equip a robot with a brain that would infallibly register the presence of water, and he was working on the further possibili-

ties of oil and other mineral deposits. There wasn't any need to stress the invaluability of such a robot to an exploring party.

"All right," Quinby said. "What does such a robot need beside his brain and his sense organs? A means of locomotion and a means of marking the the spots he finds. He'll be used chiefly in rough desert country, so a caterpillar tread will be far more useful to him than legs that can trip and stumble. The best kind of markers—lasting and easy to spot—would be metal spikes. He could, I suppose, carry those and have an arm designed as a pile driver; but . . . yes, look, this is best: Supposing he lays them?"

"Lays them?" I repeated vaguely.

"Yes. When his water sense registers maximum intensity—that is, when he's right over a hidden spring—there'll be a sort of sphincter reaction, and *plop*, he'll lay a sharp spike, driving it into the ground."

It was perfect. It would be a cheap robot to make—just a box on treads, the box containing the brain, the sense organs, and a supply of spikes. Maybe later in a more elaborate model, he could be fed crude metal and make his own spikes. There'd be a decided demand for him, and nothing of Robinc's could compete. An exploring party could simply send him out for the day, then later go over the clear track left by his treads and drill wherever he had laid a spike. And the pure functionalism of him would be the first step in our campaign to accustom the public to Quinby's Usuform Robots.

Then the ideas came thick and fast. We had among us figured out at least seventy-three applications in which usuforms could beat androids, before our eyes inevitably folded up on us.

I woke up with three sensations: First, a firm resolve to stick to whiskey and leave Three Planetses to the Martians that invented them. Second, and practically obliterating this discomfort, a thrill of anticipation at the wonders that lay ahead of us, like a kid that wakes up and knows today's his birthday. But third, and uncomfortably gnawing at the back of this pleasure, the thought that there was something wrong, something we'd overlooked.

Quinby was fixing up a real cooked breakfast. He insisted that this was an occasion too noble for swallowing a few concentrates, and he'd rummaged in my freezing storeroom to find what he called "honest food." It was good eating, but this gnawing thought kept pestering me. At last I excused myself and went into the library. I found the book I wanted: *Planetary Civil Code. Volume 34. Robots.* I put it in the projector and ran it rapidly over the screen till I located the paragraph I half remembered.

That gnawing was all too well founded. I remembered now. The theory'd always been that this paragraph went into the Code because only Robinc controlled the use of the factor that guaranteed the robots against endangering any intelligent beings, but I've always suspected that there were other elements at work. Even Council Members get their paws greased sometimes.

The paragraph read:

259: All robots except those in the military employ of the Empire shall be constructed according to the patents held by Robots Inc., sometimes known as Robinc. Any robot constructed in violation of this section shall be destroyed at once, and all those concerned in constructing him shall be sterilized and segregated.

I read this aloud to the breakfast party. It didn't add to the cheer of the occasion.

"I knew it was too good to be true," Mike grunted. "I can just see Robinc leasing its patents to the boys that'll put it out of business."

"But our being great business successes isn't what's important," Quinby protested. "Do we really want . . . could any being of good will really want to become like the heads of Robinc?"

"I do," said Mike honestly.

"What's important is what this can do: Cure this present robot epidemic, conserve raw materials in robot building, make possible a new and simpler and more sensible life for everybody. Why can't we let Robinc take over the idea?"

"Look," I said patiently. "Quite aside from the unworthy ambitions that Mike and I may hold, what'll happen if we do? What has always happened when a big company buys out a new method when they've got a billion credits sunk in the old? It gets buried and is never heard of again."

"That's right," Quinby sighed. "Robinc would simply strangle it."

"All right. Now look at it straight and say what is going to become of Quinby's Usuform Robots."

"Well," he said simply, "there's only one solution. Change the code."

I groaned. "That's all, huh? Just that. Change the code. And how do you propose to go about that?"

"See the Head of the Council. Explain to him what our idea means to the world—to the system. He's a good man. He'll see us through."

"Dugg," I said, "when you look at things straight I never know whether you're going to see an amazing truth or the most amazing nonsense that ever was. Sure the Head's a good man. If he could do it without breaking too many political commitments, I think he might help out on an idea as big as this. But how to get to see him when—"

"My brother-in-law tried once," Mike contributed. "He got kind of too persistent. That's how come he's in the hospital now. Hey," he broke off. "Where you going?"

"Come on, Dugg," I said. "Mike, you spend the day looking around the city for a likely factory site. We'll meet you around seventeen at the Sunspot. Quinby and I are going to see the Head of the Council."

We met the first guard about a mile from the office. "Robinc Repair," I said, and waved my card. After all, I assuaged Quinby's conscience, I hadn't actually resigned yet. "Want to check the Head's robot."

The guard nodded. "He's expecting you."

It hadn't been even a long shot. With robots in the state they were in, it was practically a certainty that one of those in direct attendance on the Head would need repair. The gag got us through a mile of guards, some robot, some—more than usual since all the trouble—human, and at last into the presence of the Head himself.

The white teeth gleamed in the black face in that friendly grin so familiar in telecasts. "I've received you in person," he said, "because the repair of this robot is such a confidential matter."

"What are his duties?" I asked.

"He is my private decoder. It is most important that I should have his services again as soon as possible."

"And what's the matter with him?"

"Partly what I gather is, by now, almost the usual thing. Paralysis of the legs. But partly more than that: He keeps talking to himself. Babbling nonsense."

Quinby spoke up. "Just what is he supposed to do?"

The Head frowned. "Assistants bring him every coded or ciphered dispatch. His brain was especially constructed for cryptanalysis. He breaks them down, writes out the clear, and drops it into a pneumatic chute which goes to a locked compartment in my desk."

"He uses books?"

"For some of the codes. The ciphers are entirely brain-mechanics."

Quinby nodded. "Can do. Bring us to him."

The robot was saying to himself, "This is the ponderous time of the decadence of the synaptic reflexes when all curmudgeons wonkle in the withering wallabies."

Quinby looked after the departing Head. "Some time," he said, "we're going to see a Venusian as Interplanetary Head."

I snorted.

"Don't laugh. Why, not ten centuries ago people would have snorted just like that at the idea of a black as Head on this planet. Such narrow stupidity seems fantastic to us now. Our own prejudices will seem just as comical to our great-great-grandchildren."

The robot said, "Over the larking lunar syllogisms lopes the chariot of funereal ellipses."

Quinby went to work. After a minute—I was beginning to catch on to this seeing-straight business myself—I saw what he was doing and helped.

This robot needed nothing but the ability to read, to transcribe deciphered messages, and to handle papers and books. His legs had atrophied—that was in line with the other cases. But he was unusual in that he was the rare thing: a robot who had no need at all for communication by speech. He had the power of speech and was never called upon to exercise it; result, he had broken down into this fantastic babbling of nonsense, just to get some exercise of his futile power.

When Quinby had finished, the robot consisted only of his essential cryptanalytic brain, eyes, one arm, and the writer. This last was now a part of the robot's own hookup; so that instead of using his hands to transcribe the message, he thought it directly onto the writer. He had everything he needed, and nothing more. His last words before we severed the speech connection were, "The runcible rhythm of ravenous raisins rollers through the rookery rambling and raving." His first words when the direct connection with the writer was established were, "This feels good. Thanks, boss."

I went to fetch the Head. "I want to warn you," I explained to him, "you may be a little surprised by what you see. But please look at it without preconceptions."

He was startled and silent. He took it well; he didn't blow up hysterically like Thuringer. But he stared at the new thing for a long time without saying a word. Then he took a paper from his pocket and laid it on the decoding table. The eyes looked at it. The arm reached out for a book and opened it. Then a message began to appear on the writer. The Head snatched it up before it went into the tube, read it, and nodded.

"It works," he said slowly. "But it's not a robot any more. It's . . . it's just a decoding machine."

"A robot," I quoted, "is any machine equipped with a Zwergenhaus brain and capable of independent action upon the orders or subject to the guidance of an intelligent being. Planetary Code, paragraph num—"

"But it looks so—"

"It works," I cut in. "And it won't get paralysis of the legs and it won't ever go mad and babble about wonkling curmudgeons. Because, you see, it's a usuform robot." And I hastily sketched out the Quinby project.

The Head listened attentively. Occasionally he flashed his white grin, especially when I explained why we could not turn the notion over to Robinc. When I was through, he paused a moment and then said at last, "It's a fine idea you have there. A great idea. But the difficulties are great, too. I don't need to recount the history of robots to you," he said, proceeding to do so. "How Zwergenhaus' discovery lay dormant for a century and a half because no one dared upset the economic system by developing it. How the Second War of Conquest so nearly depopulated the earth that the use of robot labor became not only possible but necessary. How our society is now so firmly based on it that the lowest laboring rank possible to a being is foreman. The Empire is based on robots; robots are Robinc. We can't fight Robinc."

"Robinc is slowly using up all our resources of metallic and radioactive ore, isn't it?" Quinby asked.

"Perhaps. Scaremongers can produce statistics—"

"And our usuforms will use only a fraction of what Robinc's androids need."

"A good point. An important one. You have convinced me that android robots are a prime example of conspicuous waste, and this epidemic shows that they are moreover dangerous. But I cannot attempt to fight Robinc now. My position—I shall be frank, gentlemen—my position is too precarious. I have problems of my own."

"Try Quinby," I said. "I had a problem and tried him, and he saw through it at once."

"Saw through it," the Head observed, "to a far vaster and more difficult problem beyond. Besides, I am not sure if my problem lies in his field. It deals with the question of how to mix a Three Planets cocktail."

The excitement of our enterprise had made me forget my head. Now it began throbbing again at the memory. "A Three Planets?"

The Head hesitated. "Gentlemen," he said at last, "I ask your pledge of the utmost secrecy."

He got it.

"And even with that I cannot give you too many details. But you know that the Empire holds certain mining rights in certain districts of Mars—I dare not be more specific. These rights are essential to maintain our stocks of raw materials. And they are held only on lease, by an agreement which must be renewed quinquennially. It has heretofore been renewed as a matter of course, but the recent rise of the Planetary Party in Mars, which advocates the abolition of all interplanetary contact, makes this coming renewal a highly doubtful matter. Within the next three days I am to confer here with a certain high Martian dignitary, traveling incognito. Upon the result of that conference our lease depends."

"And the Three Planets?" I asked. "Does the Planetary Party want to abolish them as a matter of principle?"

"Probably," he smiled. "But this high individual is not a party member, and is devoted to Three Planets. He hates to travel, because only on Mars, he claims, is the drink ever mixed correctly. If I could brighten his trip here by offering him one perfect Three Planets—"

"Guzub!" I cried. "The bartender at the Sunspot. He's a Martian and the drink is his specialty."

"I know," the Head agreed sadly. "Dza . . . the individual in question once said that your Guzub was the only being on this planet who knew how. Everyone else puts in too much or too little vuzd. But Guzub is an exiled member of the Varjinian Loyalists. He

hates everything that the present regime represents. He would never consent to perform his masterpiece for my guest."

"You could order one at the Sunspot and have it sent here by special—"

"You know that a Three Planets must be drunk within thirty seconds of mixing for the first sip to have its ideal flavor."

"Then—"

"All right," Quinby said. "You let us know when your honored guest arrives, and we'll have a Three Planets for him."

The Head looked doubtful. "If you think you can— A bad one might be more dangerous than none—"

"And if we do," I interposed hastily, "you'll reconsider this business of the usuform robots?"

"If this mining deal goes through satisfactorily, I should be strong enough to contemplate facing Robinc."

"Then you'll get your Three Planets," I said calmly, wondering what Quinby had seen straight now.

We met Mike at the Sunspot as arranged. He was drinking a Three Planets. "This is good," he announced. "This has spacedrive and zoomf to it. You get it other places and—"

"I know," I said. "Find a site?"

"A honey. Wait'll I—"

"Hold it. We've got to know have we got anything to go on it. Guzub! One Three Planets."

We watched entranced as he mixed the potion. "Get exactly what he does," Quinby had said. "Then construct a usuform bartender who'll be infallible. It'll satisfy the Martian envoy and at the same time remind the Head of why we're helping him out."

But all we saw was a glittering swirl of tentacles. First a flash as each tentacle picked up its burden—one the shaker, one the lid, one the glass, and three others the bottles of rum, margil, and vuzd. Then a sort of spasm that shook all Guzub's round body as the exact amount of each liquid went in, and finally a gorgeous pin-wheel effect of shaking and pouring.

Guzub handed me my drink, and I knew as much as I had before.

By the time I'd finished it, I had courage. "Guzub," I said, "this is wonderful."

"Zure," Guzub glurked. "Always I maig id wondervul."

"Nobody else can make 'em like you, Guz. But tell me. How much vuzd do you put in?"

Guzub made his kind of a shrug. "I dell you, boys, I dunno. Zome dime maybe I wadge myzelv and zee. I juzd go zo! I dunno how mudj."

"Give me another one. Let's see you watch yourself."

"Businezz is good by you, you dring zo many Blanedz? O Gay, ere goes."

But the whirl stopped in the middle. There was Guzub, all his eyes focused sadly on the characteristic green corkscrew-shaped bottle of vuzd. Twice he started to move that tentacle, then drew it back. At last he made a dash with it.

"Exactly two drops," Quinby whispered.

Guzub handed over the drink unhappily. "Dry id," he said.

I did. It was terrible. Too little vuzd, so that you could taste both the heavy sweetness of the rum and the acrid harshness of the margil. I said so.

"I knew, boys. Wen I zdob do wadge, id bothers me. No gan do."

I gulped the drink. "Mix up another without watching. Maybe we can tell."

This one was perfect. And we could see nothing.

The next time he "wadged." He used precisely four and half drops of vuzd. You tasted nothing but the tart decay of the vuzd itself.

The next time—

But my memory gets a little vague after that. Like I said, I'm a whiskey drinker. And four Three Planetses in quick succession— I'm told the party went on till closing hour at twenty-three, after which Guzub accepted Quinby's invitation to come on and mix for us at my apartment. I wouldn't know. All I remember is one point where I found a foot in my face. I bit it, decided it wasn't mine, and stopped worrying about it. Or about anything.

I'm told that I slept thirty-six hours after that party—a whole day and more simply vanished out of my existence. I woke up feeling about twelve and spry for my age, but it took me a while to reconstruct what had been going on.

I was just beginning to get it straightened out when Quinby came in. His first words were, "How would you like a Three Planets?"

I suddenly felt like two hundred and twelve, and on an off day at that. Not until I'd packed away a superman-size breakfast did he dare repeat the offer. By then I felt brave. "O. K.," I said. "But with a whiskey chaser."

I took one sip and said, "Where's Guzub? I didn't know he was staying here too."

"He isn't."

"But this Three Planets— It's perfect. It's the McCoy. And Guzub—"

Quinby opened a door. There sat the first original Quinby Usuform—no remake of a Robinc model, but a brand-new creation. Quinby said, "Three Planets," and he went into action. He had tentacles, and the motions were exactly like Guzub's except that he was himself the shaker. He poured the liquids into his maw, joggled about, and then poured them out of a hollow hoselike tentacle.

The televisor jangled. Quinby hastily shifted the ike so as to miss the usuform barkeep, as I answered. The screen showed the Head himself. He'd been there before on telecasts, but this was the real thing.

He didn't waste time. "Tonight, nineteen thirty,' he said. "I don't need to explain?"

"We'll be there," I choked out.

A special diplomatic messenger brought the pass to admit the two of us and "one robot or robotlike machine" to the Council building. I was thankful for that alternative phrase; I didn't want to have to argue with each guard about the technical legal definition of a robot. We were installed in a small room directly off the Head's private reception room. It was soundproofed and there was no window; no chance of our picking up interplanetary secrets of diplomacy. And there was a bar.

A dream of a bar, a rhapsody of a bar. The vuzd, the rum, the margil were all of brands that you hear about and brood about but never think to see in a lifetime. And there was whiskey of the same caliber.

We had hardly set our usuform facing the bar when a servant came in. He was an android. He said, "The Head says now."

Quinby asked me, "Do you want one?"

I shook my head and selected a bottle of whiskey.

"Two Three Planetses," Quinby said.

The tentacles flickered, the shaker-body joggled, the hose-tentacle poured. The android took the tray from our usuform. He looked at him with something as close to a mixture of fear, hatred, and envy as his eye cells could

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express. He went out with the tray.

I turned to Quinby. "We've been busy getting ready for this party ever since I woke up. I still don't understand how you made him into another Guzub."

There was a click and the room was no longer soundproof. The Head was allowing us to hear the reception of our creation. First his voice came, quiet, reserved and suave. "I think your magnitude would enjoy this insignificant drink. I have been to some slight pains to see that it was worthy of your magnitude's discriminating taste."

There was silence. Then the faintest sound of a sip, a pause, and an exhalation. We could almost hear the Head holding his breath.

"Bervegd!" a deep voice boomed—which since no Martian has ever yet learned to pronounce a voiceless consonant, means a verdict of "Perfect!"

"I am glad that your magnitude is pleased."

"Bleased is doo mild a word, my dear Ead. And now thad you ave so delighdvully welgomed me—"

The sound went dead again.

"He liked it, huh?" said Guzub II. "You boys want some, maybe?"

"No thanks," said Quinby. "I wonder if I should have given him a Martian accent—they are the best living bartenders. Perhaps when we get the model into mass production—"

I took a gleefully long swig of whiskey. Its mild warmth felt soothing after memories of last night's Three Planetses. "Look," I said. "We have just pulled off the trick that ought to net us a change in the code and a future as the great revolutionists of robot design. I feel like . . . hell, like Ley landing on the Moon. And you sit there with nothing on your mind but a bartender's accent."

"Why not?" Quinby asked. "What is there to do in life but find what you're good for and do it the best way you can?"

He had me there. And I began to have some slight inklings of the trouble ahead with a genius who had commercial ideas and the conscience of an other-worldly saint. I said, "All right. I won't ask you to kill this bottle with me, and in return I expect you not to interfere with my assassinating it. But as to what you're good for—how did you duplicate Guzub?"

"Oh that. That was simple—"

"—when you looked at it straight," I ended.

"Yes." That was another thing about Quinby; he never knew if he was being ribbed. "Yes. I got one of those new electronic cameras—you know, one thousand exposures per second. Hard to find at that time of night, but we made it."

"We?"

"You helped me. You kept the man from overcharging me. Or maybe you don't remember? So we took pictures of Guzub making a Three Planets, and I could construct this one to do it exactly right down to the thousandth of a second. The proper proportion of vuzd, is case you're interested, works out to three-point-six-five-four-seven-eight-two-three drops. It's done with a flip of the third joint of the tentacle on the down beat. It didn't seem right to use Guzub to make a robot that would compete with him and probably drive him out of business; so we've promised him a generous pension from the royalties on usuform barkeeps."

"We?" I said again, more feebly.

"You drew up the agreement."

I didn't argue. It was fair enough. A good businessman would have slipped Guzub a fiver for posing for pictures and then said the hell with him. But I was beginning to see that running Q. U. R. was not going to be just good business.

When the Head finally came in, he didn't need to say a word, though he said plenty. I've never seen that white grin flash quite so cheerfully. That was enough; the empire had its Martian leases, and Q. U. R. was a fact.

When I read back over this story, I can see there's one thing wrong. That's about the giller. I met Dugg Quinby, and you met him through me, in the act of rescuing a Venusian from a giller-baiting mob. By all the rights of storytelling, the green being should have vowed everlasting gratitude to his rescuer, and at some point in our troubles he should have showed up and made everything fine for us.

That's how it should have been. In actual fact the giller grabbed his inhalator and vanished without so much as a "thank you." If anybody helped us, it was Mike, who had been our most vigorous enemy in the battle.

Which means, I think, that seeing straight can work with things and robots, but not with beings, because no being is really straight, not even to himself.

Except maybe Dugg Quinby.

THE END.

# BRASS TACKS

*If there were a change in the velocity of light within the Solar System, it would show up in the study of the motions of the planets, too. No such effect has been observed.*

Dear Mr. Campbell:

Mr. A. T. Short's letter and hypothesis in the December Astounding were interesting and thought-provoking. There are a number of points which I should like, with his permission, to comment upon and amplify.

Mr. Short is not, perhaps, as close to Probability Zero as he feels. Granted that the velocity of light is considered a constant, this is only true for a given medium. The phenomenon of refraction is explainable only by differences in the velocity of light in various media, and the "index of refraction" of a substance is the ratio of the velocity of light outside the medium to that inside.

In the hypothesis itself he mentions that light is "subject to strains, drags and dissipations." He need not apologize for this statement. It is a known fact that light loses energy in overcoming the Sun's gravitational field on its way out of that massive body (this is clearly demonstrable by a shift to the red found in such light; is it not a Doppler shift, but simply the result of a slight loss of energy by each quantum individually—and a quantum of light cannot lose energy by weakening, but only by dropping in frequency. A "weaker" light would mean fewer quanta—) Also the Sun's gravitational field has been found to deflect light traveling in a path close to it, as though it were an enormous lens—there was an article in Astounding a couple of years back dealing with this effect.

We have, then, two possibilities at our disposal. A nonuniformity of the transmitting medium (perhaps due to the presence or absence of gas or meteoric dust; or possibly a less dense concentration of the medium, whatever it is—I hate to postulate a "luminiferous ether"—due to the weakening of the Sun's gravitational field) out in the remoter regions, of the comet's orbit. If this increased the velocity of light in these remote regions, the result might be as described.

Or if the mere attraction of the Sun's gravitational field could cause greater light velocity in the direction of those outer regions to us, might we not again expect the same result?

The only other alternative is an "ether drift" in this direction; and the Michelson-Morley experiment seems pretty well to have put a spoke in that wheel.

I got rather enmeshed in the words of F. B. Long's story in the December issue, and I'm still not at all sure what happened. If another half a dozen readings don't clear it up, I'll take it to Ralph Hamilton, who knows something about semantics. The remainder of the issue was very enjoyable indeed.—Charles H. Chandler, 920 College Avenue, Wooster, Ohio.

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*It is the end of another year, at that.*

Dear Mr. Campbell:

Well, another year of Astounding has slowly gone by, out of the realms of unreality and toward the long corridors of the past. Methinks, that if all concerned can stand the strain, another Annual—this time '40—Analytical Lab is about to be given birth to. Here 'tis, in a four-part pattern.

*Stories:*

Mentally chewing over the year's fiction, I tried to think of the really outstanding ones—and couldn't! Or, at least, the few I could remember formed far too meager a list. Surprised and curious, I lugged out the year's pile for examination and correlation—and found the answer, methinks. At any rate, one possible conclusion—that Astounding's fiction has suffered a tremendous slump—can easily be discarded. It isn't so much the fact that there were few yarns head and shoulders above the rest, as that there were so many top-notch ones that few *could* be much better! Merely that relativity of comparison had been at fault, that changing basis had thrown standards out of alignment.

Thus it is that the usual pet Ten Best is difficult to compile, what with the many competitors. But after much thumbing of pages and mental convolutions:

1. "Beyond This Horizon"—MacDonald. This, at any rate, was an easy choice. I still think it's one of best developments of a future civilization I've seen. Reader Short may be partly right about the plot being not too wonderful, but still the story surmounts such obstacles brilliantly.

2. "Waldo"—MacDonald. Definitely unusual, really worthy of the old "nova" classification—though the metaphysics undoubtedly made some of the heavy-science boys froth at the mouth. Superb from all angles and a close second.

3. "There Shall Be Darkness"—Moore. This is the first of those top-notch yarns mentioned above, and from here on down hot competition ensues. Tinged with fantasy, perhaps, this yarn featured excellent writing, superb characterization and a good plot.

4. "Minus Sign" and "Collision Orbit"—Stewart. A new concept, a new continuity, a new author—and all three good! A really neat piece of work.

5. "Recruiting Station"—Van Vogt. Ye Old Reliable is back, with a time-travel tale par excellence. Plot meandered a bit, but wonderful verisimilitude.

6. "Bridle and Saddle"—Asimov. This was the second of a series of yarns heavy-laden with potentialities. And some of 'em were being beautifully exploited in this!

7. "Tools"—Simak. Undoubtedly the dark horse of the year. That portrayal of alien life, writing and all the rest—a very good job.

8. "Penance Cruise"—Reed. A bit of lighthearted verbiage, almost wacky at times, that is practically unbeatable. Astounding could definitely stand a strong shot of this stuff.

9. "The Weapon Shop—van Vogt. A relatively far-in-the-future civilization, with the usual revolution set-up—but the hand of a master makes all the difference.

10. "Nerves"—del Rey. Heavy science of the neutronium variety. Good, though. However, I'd probably break down under the strain of having to read this sort all the time.

Runners up? "Barrier"—Boucher; "Asylum"—van Vogt; "Mechanistria"—Russell; "Secret Unattainable"—van Vogt; "Co-operate or Else"—same; "The Wabbler"—Leinster; "On Pain of Death"—Williams—and even "Second Stage Lensman"!

*Format:*

The year of large size has been quite an improvement over the old, even though I occasionally think with nostalgia of the crisp compactness of the old. The cover work also has shown no drop in quality, even with the disappearance of Rogers—for his successors were well chosen. Excluding July, best covers were

those of January, October and December.

Even the weak point of interior pix was strengthened, though improvement is still needed. Isip, Schneeman and Orban are getting better—Orban being particularly good in "Some Day We'll Find You." Which comes as a big surprise. More such cuts in longer yarns would break 'em up nicely. Finlay and Paul would be welcome arrivals, as Kramer and Kolliker go scooting out another entrance.

*Addenda:*

Which, of course, includes the articles and readers' departments. I refuse to rate anything here, though apparently Ley and de Camp have held an iron grip on supremacy in the former section. Editorials have shown some slight deterioriation from '41, but are still quite good. As are Analytical Lab and In Times to Come. Brass Tacks receives a noncommittal stare. Probability Zero has helped things along, too.

*Summation:*

Right now, Astounding is at the high point of its career. It is at a point where much further improvement is difficult, and where a downhill slide is quite easy. A position in which it would be simple to get out of the groove and into a rut. As it is, ASF is now producing the sort of stuff that I'll probably think back to some day and sigh, "Them was the good old days!" Hope you can keep it that way!

Good luck!—Bill Stoy, 140-92 Burden Crescent, Jamaica, New York.

*Know any service men—*

Dear Mr. Campbell:

September Astounding very, very good.

1. "Nerves"—Magnificent!
2. "The Barrier"—Excellent.
3. "Pride"—Splendid.
4. "With Flaming Swords"—Good.
5. "Twonky"—Clever.
6. "Starvation"—Good of its type.
7. Article—Interesting.

Cover and inside pics, good. The new artists are developing in good shape. However, none in this issue I would especially want for my collection. Timmins doing nice cover work.

Hope no more of my fan friends get in the service—I have to get four copies every month now—and that's money.—E. Everett Evans, 191 Capital Avenue, S. W., Battle Creek, Michigan.


WARNING TO HUSBANDS:

DON'T RUMMAGE

through your wife's bureau drawers!

This particular husband did. He was a professor of anthropology and ethnology. And he found, among his wife's effects, a small bottle. Nothing unusual in that—except that the label on the bottle read

"Graveyard dirt—taken at the dark of the moon."

And that plunged the professor into a series of events that was startling . . . to say the least! Read CONJURE WIFE, by Fritz Leiber, Jr., complete novel in the April issue of

UNKNOWN WORLDS

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# MUTUALLY EXCLUSIVE

*Continued from page 6*

But they still couldn't cross over each other, unless you assume that the repulsion is so superspecific that it reacts only against some one special material which is not used in the construction of the craft themselves. That simply means, though, that your automobiles ride several hundred feet above the roads instead of on them; the special material must be included in the roads. And if such narrow beams are used, the pressure per square foot exerted by them would require a hard-surfaced track for support.

The one type of machine which could operate freely, without let or hindrance in the traffic-crowded air of a great city, at all levels, in all directions, and without mutual interference is the antigravity type lighter-than-air ship. Since it achieves the flotation not by displacing a huge bulk of air, but by decreasing its own inherent weight, it can be maneuverable, small in bulk, fast, and completely useful. It, and it alone, could operate freely in the air of those future cities in the manner described in science-fiction.

There's just one thing that makes that impossible as a stable situation, however. The antigravity airship makes cities themselves improbable and useless. A city exists simply as a concentration of workers about adequate transportation facilities, where the communication facilities permit them to co-operate freely and rapidly to accomplish the things that must be done to maintain the standard of living their culture has developed. Cities have always developed about convenient communication and transportation facilities. A great natural harbor means a city—water transport is cheap and exceedingly efficient. A meeting of railroad lines has meant the development of a major inland city. Where navigable rivers meet you're apt to find cities. Transportation and communication have meant cities; the short range of rapid transportation and communication has emphasized the tendancy to concentrate within a small area about the good transport and communication facilities.

An antigravity ship would mean that any point on the surface of the Earth was exactly as accessible as any other point on the planet. Antigravity transport would be even cheaper than water transport; immense antigravity barges towed by small tugs could ship half a million tons of fresh water from the Great Lakes to the Mojave Desert at a negligible cost, and in a period of a few hours. There would be no point whatever in water transportation of materials, because the source is practically never at the harbor itself, and the demand is almost invariably more or less inland. It would be cheaper and easier to ship by antigravity barge all the way.

And there's no pleasure in living in cities—except the convenience of rapid, easy transportation. There's no point in manufacturing plants being established in groups, save that the supply of workers must be found within easy transportation range of the factory. With antigravity cars, anything within five hundred miles would be a half-hour run at the most.

Certainly the antigravity cars could operate freely and in swarms through the crowded air of city traffic.

Only there wouldn't be any cities to have traffic-crowded air if the antigravity car was available.

The present-day tendency toward decentralization to promote better living conditions would be carried to its ultimate. Even the great manufacturing plants, big because mass production is easier, cheaper and better, would split into dozens of small, scattered shops, and one master assembly shop. The antigravity cars would have bodies built in a plant near the source of the plastic materials used in its structure—and also situated on some pleasant mountain lake for the nerve-easing scenery. The magnesium and aluminum casting foundry would be near the sea somewhere—perhaps a thousand miles away—that a satisfactory beach and proper conformation of shore line combined to make a bathing beach for workers and easy extraction of magnesium and aluminum from the sea water.

Certain types of industry would be mounted permanently on antigravity barges for easy movement of the whole plant.

But under no possible circumstances could a true major city maintain its existence in competition with the omnipresent ships.

You can't have your cake and eat it, too: you can't have your city, and cheap, maneuverable low-cost three-dimensional transport too, either. Except for the moment when the cake is half eaten—and the antigravity ship is newly invented and only half appreciated.

THE EDITOR.

THE END.

# THE WEAPON MAKERS

## By A. E. van Vogt

*Second of three parts.*

***CAPTAIN HEDROCK,*** *one man against the system-wide empire of the Isher Dynasty and, simultaneously against the vast underground power of the Weapon Makers—one man, but also Earth's one immortal man! One man with plans and motivations so secret that none in the whole system could guess them, or the secret of his work!*

Illustrated by Kramer

### SYNOPSIS OF PART I

*The Isher Empire is a complicated super-civilization, the greatest complication being a unique organization known as the Weapon Makers. Outlawed, altruistic, independent, the Weapon Makers maintain shops everywhere on Earth, and on Mars, Venus and the moons of Jupiter. They do this by means of secret inventions in open defiance of the hostile Isher Government.*

*Mainly, they sell guns of every description, their creed being "The Right to Buy Weapons Is the Right To Be Free." But the Weapon Makers engage in other, less well-known activities. They maintain, for instance, the most up-to-date INFORMATION CENTER in the inhabited Solar System, as Dan Neelan discovered just as he was despairing of ever finding a clue to the disappearance of his twin brother, Gil.*

*Between Neelan and his brother, there had existed an intimate mental and neural relationship, the result of training in the Eugenics Institute. They could reach each other's minds at short distances; at millions of miles the feel of the other's life remained strong, a tingling awareness.*

*It was that awareness of Gil that had come to an abrupt end inside Neelan—and now, on returning to Earth to find out what had happened, he ran up, first, against utter mystery; and then learning of the Weapon Makers' INFORMATION CENTER, he discovered from them the address in Imperial City where Gil had been employed before his disappearance.*

*To Neelan's amazement, the address turns out to be a spaceship hangar, and the ship is in. Aboard is one man, an unpleasant chap called Greer, whom Neelan overpowers.*

*He is immediately in full control of the ship, which turns out to be a new invention of stupendous importance. It contains the first super-fast stellar drive. The drive was invented by the employer of Neelan's brother Gil, a noted scientist named Derd Kershaw; and the first trip was to the famous nearest star system of Alpha Centauri.*

*Greer marooned Gil and the others there, leaving them to die horribly on a hellish desert planet of one of the Centauri suns. But Greer refuses to tell what has happened; and so Neelan grim with anger goes out to obtain a Lambeth mind-controller, an instrument by which he intends to obtain from Greer the details of his treachery, and so rescue Gil.*

*All unknown to Neelan, however, the brilliant Empress Isher has been bargaining with Greer for the sale of the ship, intending to suppress the entire invention.*

*Almost as soon as Neelan leaves the ship, he is captured and brought to the palace. He refuses to talk and is to be tortured.*

*The empress considers the matter so vital, the secret of interstellar travel so dangerous to the sovereignty of her family, that she has earlier the same*

*day sentenced to death by hanging a Captain Hedrock, whom she believes to be a Weapon Shop spy.*

*Captain Hedrock, however, is more than just a Weapon Shop agent, protecting Weapon Shop interests inside the palace. He is Earth's only immortal man, with private long-range purposes of his own, transcending any temporary commitments which he might make.*

*By a remarkable display of personality and by consummate showmanship, he persuades the Imperial ruler not to hang but to exile him. Realizing that the effect of his persuasion on the volatile empress won't last, he hurries at top speed to the airport on the palace roof.*

*But he is too slow. Guards are waiting at the roof elevators to arrest him.*

## PART II.

### VII.

For a shattering moment, as Hedrock stood on the palace roof facing that score of men, his mind, adjusted to victory, could not accept the threatening defeat. At last the wry, unwelcome thought came that so many men was a mighty compliment indeed to his prowess. Only—

What an utterly empty commendation. The devastating reality was that here were enough men to handle anything he might attempt.

And attempt he had to! The empress *must* have known when she gave this positive order to intercept him that he could only draw the worst conclusions—and resist with every power that he could muster.

Far, far past was the time for subtlety, injured innocence and cleverness. Just a few distracting words; and then—

But even that couldn't be thought out clearly. There wasn't time, not a second, not an instant!

His deep baritone clashed across the silence like the clang of vibrating steel: "What do you want?"

There were great moments in the history of the world when that bellow of his had produced a startled lull in the will to action of better men than any that stood here before him. Astoundingly, unbelievably, it had no such effect now.

Hedrock stood stunned. His muscles, tensed for the run that was to take him through the ranks of the men while they stood paralyzed, sagged. The large carplane which had seemed so near a moment before, only twenty-five feet, tantalized him now. His purpose—to reach it—collapsed into a staggered awareness of his desperate situation.

One man with one gun against twenty guns! True, his was an Unlimited, and like all Weapon Shop guns projected a defensive half circle around him, sufficient to counteract the fire of eight ordinary weapons but—

His hard, mental assessment of his position ended as the huskily built young man who had pronounced him under arrest stepped forward from the group, said crisply:

"Now, don't do anything rash, Mr. Weapon Shop Jones. You'd better come quietly."

"Jones!" said Hedrock; and enormous shock made the word quiet, almost gentle; shock and a staggering sense of relief. For a terrible moment, actually, the gap between his first deadly assumption and the extraordinary reality seemed too great to bridge without some superhuman effort of will.

The next second he caught hold of his reeling brain—and the tearing storm of tension was over.

His ice-cold gaze flashed with lightning appraisal toward the uniformed palace guards who were standing on the fringe of the group of plain-clothes men, interested spectators rather than participants. And he sighed under his breath as their faces remained blank of suspicion. He said:

"I'll go quietly."

The plain-clothes men crowded around him, and herded him into the carplane. The machine took off with a lurch, so swiftly was it maneuvered into the air.

Breathless, Hedrock sank into the seat beside the man who had given him the Weapon Shop password for that day. He found his his voice after a minute.

"Very bravely done," he said warmly, "very bold and efficient. I must say though you gave me an awful shock."

He laughed at the recollection, and was about to go on when the odd fact struck him that his hearer had not smiled in sympathetic response. His nerves, still keyed to unnatural sensitivity, examined that small, jarring fact as if it were a gigantic bombshell. He said slowly:

"You don't mind if I ask your name?"

"Peldy." Curtly.

"Who thought of the idea of sending you?"

"Councilor Peter Cadron."

Hedrock nodded. "I see. He thought if I had to fight my way to the roof, I'd be needing help by the time I got there."

"I have no doubt," said Peldy, "that that is part of the explanation."

He was cold, this young man. The chill of his personality startled Hedrock. He stared gloomily down through the transparent floor at the unreeling scene below.

The plane, conforming to speed regulations, was slowly heading deeper into the city. Two-hundred-story skyscrapers seemed to graze the bottom of the machine as Hedrock thought bleakly:

Suppose they were suspicious of him. It was not impossible. In fact—Hedrock smiled with humorless certainty—all that had ever been needed was for some of the Weapon Shop mental wizards to turn their full attention to his case.

Abruptly, that was depressing. For despite all his years of experience, these Weapon Shop supermen with their specialized training had inexorably forged ahead of him in a dozen fields.

He could not even plan for his own protection, because the techniques of education that had molded their brains from childhood were useless applied to his mind, which had been cluttered with confused, unplanned integrations ages before the techniques now so dangerous to him were invented.

He grew colder, and some of the weariness of his long years sagged heavily over his spirit, the strain of his tremendous, his transcendental purpose—that purpose which required that he keep from all men the knowledge that he was immortal; or else the purpose would be smashed, leaving for him an empty, futile existence—and death was better.

Hedrock roused himself. "Where are you taking me?"

"To the hotel."

Hedrock nodded. The Hotel Royal Ganeel! City headquarters of the Weapon Makers—to be taken there meant definitely something was up.

He watched the plane settle toward the broad garden roof of the hotel, his mind stiff as an iron bar with the realization that the Weapon Shops took no chances. They *couldn't!* Their whole existence depended on their secrets remaining—secrets. If they ever

doubted anyone who knew certain basic things about their organization, as he did—

The life of one man would be considered as nothing before the safety of all in an implacable world.

There was, of course, the hotel.

The Hotel Royal Ganeel was about two hundred years old. It had cost, if he remembered correctly, seven hundred fifty million credits; and its massive base spread over four city blocks. From this monstrous beginning, it went up in pyramidic tiers, streamlined according to the waterfall architecture of its age, leveling off at twelve hundred feet into a roof garden eight hundred feet long by eight hundred wide, the hard squareness of which was skillfully alleviated by illusion and design.

He had built it in memory of a remarkable woman who was also an Isher empress, and in every room he had installed a device which, properly activated, provided a vibratory means of escape.

The activating instrument, unfortunately, was one of the three rings he had left behind him in the palace. Hedrock grimaced in rueful vexation, as he headed with the others from the plane to the nearest elevator because, after all the careful moments he had spent deciding not to wear more than the ring gun, lest suspicion fall upon those remarkable secret machines of the Weapon Shops, here was tremendous need for the one ring he would not have taken anyway.

There were other rings in secret panels scattered through the hotel, but it was surpassingly doubtful if a man with twenty guards escorting him straight down to the great section of the building occupied by the Imperial City headquarters of the Weapon Makers would have any leisure for side trips.

His grim reverie ended, as the elevator stopped. The men crowded him out onto a broad corridor before a door on which glowing letters spelled out simply:

THE METEORITE CORPORATION
HEAD OFFICES

The sign, Hedrock knew, was only half false. The gigantic mining trust was a genuine firm, doing a vast metal and manufacturing business. That it was also an unsuspected subsidiary of the Weapon Shops was quite aside from the main point, except, as in the present instance, where its various offices served as fronts, behind which facets of the Weapon Shop world glittered in uninterrupted, unhindered activity.

As Hedrock walked into the great front offices, a tall, fine-looking, middle-aged man was emerging from an opaque door fifty feet away. Recognition was almost simultaneous; the man hesitated the faintest bit, then came forward, his smile friendly.

"Well, Mr. Hedrock," he said, "how's the empress?"

Hedrock's smile was stiff. The great No-man's hesitation had not been lost on him. He said: "I am happy to say that she is in good health, Mr. Gonish."

Edward Gonish laughed, a rich-toned laughter. "I'm afraid there are thousands of people who are always saddened when they hear that. At the moment, for instance, the council is trying to use my intuitive training to track down the secret of the empress. I'm studying Pp charts of known and potentially great men; it's miserable data to go on, far less than the ten percent I need.

"I've only reached the letter M as yet, and I have only come to tentative conclusions. If it's an invention, I would say interstellar travel; but that isn't a full intuitive."

Hedrock frowned. "Interstellar travel! She would be opposed to that—" He stopped; then, in an intense voice: "You've got it! Quick, who's the inventor?"

Gonish laughed again. "Not so fast. I have to go over all the data."

His laughing eyes grew abruptly grave. The No-man stood frowning at Hedrock, said finally, anxiously:

"What the devil's up, Hedrock? What have you done?"

The secret police officer, Peldy, stepped forward, said quickly: "Really, Mr. Gonish!"

The proud face of the No-man turned coldly on the young man. "That will do," he said. "Step back out of hearing. I wish to talk to the prisoner alone."

Peldy bowed. "I beg your pardon, sir. I forgot myself."

He backed away, then began to wave his men off. There was a milling, and murmured questions; in less than a minute, however, Hedrock was alone with the No-man, the first great shock fading in a series of little, mental pain waves.

A prisoner! He had known it of course in

a kind of a way, but he had tried to think of his position as one which, if he pretended not to recognize it, and the suspicion was not great, the Weapon Shop leaders might not force the issue into the open.

Actually, that stage was long past if indeed it had ever existed. The suspicion was already beyond the inner circle of the council. Definitely, the sands of his time were running out and— But Gonish was speaking again, swiftly:

"The worst part of it is, they refused to listen when I suggested that the whole business be left over for me to investigate in my capacity as No-man. That's bad. If you could leave me some idea as to what—"

Colder now, steadier, Hedrock shook his head. "All I know is that, two hours ago, they were worried that I might be killed by the empress. They actually sent a rescue force—at least so I thought—but it turned out I was, and am, under close arrest."

The tall Gonish stood thoughtful. "If you could only put them off some way," he said. "I don't know enough about the individual psychologies of the councilors or about the case to offer one of my intuitive opinions, but if you can possibly twist the affair into a trial of evidence and counterevidence, that would be a partial victory. They're a pretty high-handed outfit, so don't just knuckle under their decision as if it was from God. Either put it off or—"

He walked off, frowning, toward a distant door; and Hedrock grew aware of Peldy striding forward.

"This way, sir, the council will see you immediately."

"Eh?" said Hedrock. The sense of warmth produced by the No-man's friendly intent faded before shocked amazement. "You mean, the council is in the local Chamber?"

There was no answer; nor did he really expect one. The sharp questions had been purely rhetorical, but—

Put it off indeed!

Men sitting at a V-shaped table, on a dais —that was the scene, as he came alone through the door, and heard it close behind him with a faint click.

It seemed immeasurably strange to be thinking that two years before he had been offered a seat on the council. And had refused.

It was a curious assortment of fine-looking men of every age, ranging from the brilliant thirty-year-old executive, Ancil Nare, to hoary-headed Bayd Roberts. Not all the faces were familiar to him.

Hedrock counted noses, thinking about what the No-man had said: "Make it a trial!" That meant—force them out of their smug rut and—

He felt shocked, as he finished his counting: Thirty! The full council of the Weapon Makers. What could they have found out about him, to bring all of them here?

For a vivid moment, the pictured these leaders at their headquarters far and near, on Mars, Venus, on those moons that rated so exalted a representative—*everywhere* councilors stepping through their local vibratory transmitters, and instantly arriving here.

And all for him; abruptly, that was startling again—and steadying. With head thrown back, fully conscious of his leonine head, and of his unmistakably notable appearance, aware, too, with a grim sardonicism of the generations of men like this who had lived and died, and lived and died, and died, and died, since his own birth—Hedrock broke the silence:

"What's the charge?" he asked resonantly. And into those words he put all the subtle, tremendous power of his trained voice, his vast experience in dealing with every conceivable type and group of human beings.

The three vibrantly spoken words were immeasurably more than just a question. They were an all-out expression of will and determination, the very essence of pride and a grand superiority—and dangerous as death itself.

Radical, simple, tremendous words—accepting in full the implication that his very presence here meant execution—and designed to take uttermost advantage of a great basic reality: the natural, time-proven reluctance of highly intelligent men to destroy a human being recognizably their peer.

Here before him were the supremely intelligent men—and who else in all the universe could better act, feel and think superior than the one man immortal sprung from Earth's proud race?

There was a stirring along that gleaming V-table. Feet shuffled on the dimly glowing dais. Men turned to look at each other questioningly. It was Peter Cadron who finally climbed to his feet.

"I have been asked," he said quietly, "to speak for the council. It was I who origi-

nated the charge against you."

He did not wait for a reply, but turned slowly to face the V-table, said gravely:

"I am sure that everyone present has suddenly become acutely aware of the personality of Mr. Hedrock. It is interesting to note how exactly this exhibition of hitherto concealed power verifies what we have discovered. I must confess my own amazement at the vivid force of it. I—"

"That goes for me, too," interrupted the heavy-faced Deam Lealy. "Until this minute, I thought of Hedrock as a soft-spoken, reserved sort of fellow. Now, suddenly, he's cornered, and he flashes fire."

"There's no doubt," said the youthful Ancil Nare, "that we've uncovered something remarkable. We should strive for a thorough explanation."

It was—disconcerting; his entire action enlarged upon beyond his intent, distorted by an expectation that he was not what he seemed.

The truth was he was no more superior to these men than they were to each other. The knowledge that he was immortal had always given a dynamic, *ping*like quality to his confidence. And there was, of course, that genuinely supernormal, over-the-ages development of his personality, an electrical, abnormal manifestation of aura that he could suppress, and nearly always had suppressed, by an unassuming mien.

The devilish thing was that by revealing its full force, when they were looking for it, had made them think him alien.

Here was a dangerous backfire, requiring instant modification. He said:

"This is ridiculous. An hour ago I was in the gravest danger of my five years of service with this organization; so grave that I think I can truthfully say: no one else would have come out alive.

"Within minutes after undergoing that nerve-racking strain, I find myself arrested by my friends on an unnamed charge. Angry?

"Of course I'm angry. But what particularly gets me is this curious nonsense about my inhuman personality. Am I standing before the High Council of the Weapon Makers, or by some primeval fireside where the voodoo doctors are busily exorcising demons? I demand to be treated as a loyal Weapon Shop human being without a single black mark against his record; as a man, not a monster —but now I repeat: *What is the charge?*"

There was a flat silence. Then Peter Cadron said:

"You will learn that in due time. But first —Mr. Hedrock, where were you born?"

So they had got *that* far.

He felt no fear. He stood there, a little sad, conscious of grim amusement that his oldest bogy was at last come home to roost.

For a long moment, all the names he had ever had made a kaleidoscopic picture before his mind's eye. How carefully he had chosen them in the early days, with a meticulous attention to assonance, rhythmic quality, and how they looked in print.

And then, a gradual impatience with high-sounding nominals had produced a whole series of satiric reactions: Petrofft, Dubrinch, Glinzer. That phase, too, had passed until now, for ages, simple names unadorned by any really pleasing attributes had distinguished his unchanging form.

There was, of course, the fact that every name has always required a birthplace and a host of relevant data, a very wearing business; and it was possible—Hedrock frowned—just possible that he had been careless.

He said: "You have my records. I was born in Centralia, Middle Lakeside States."

"You took a long time answering that question," snapped a councilor.

"I was," said Hedrock coolly, "trying to imagine what lay behind the question."

Cadron said: "What was your mother's name?"

Hedrock studied the man's even-featured countenance in the beginning of puzzlement. Surely they didn't expect to get him on anything so simple as that. He said: "Delmyra Marlter."

"She had three other children?"

Hedrock nodded. "My two brothers and sister all died before reaching their majority."

"And your father and mother died when?"

"Dad eight years ago, mother six."

Amazingly, that came hard. For a bare moment, it was difficult to employ those intimate terms for two pleasant middle-aged people whom he had never met, but about whom he had forced himself to learn so much.

He saw that Cadron was smiling with dark satisfaction at the other councilors.

"You see, gentlemen, what we have here: A man whose people are deceased, who has no living relatives, and who five years ago, *after his family was all dead*, entered the Weapon

Shop organization in the usual manner—and by means of talents considered extraordinary even then when we didn't know how much of himself he was holding back, quickly rose to a position of great trust.

"Furthermore, it was a position of his own making, created as a result of sustained personally conducted propaganda—and agreed to by us because we had become alarmed that the empress might do us harm unless she was watched more carefully than previously.

"One of the important factors in all this is that it is doubtful if, in all our vast organization, with its tens of thousands of able men, a single other person could have been found who was capable of sustaining the interest of the extraordinary Empress Innelda for six long months."

"And even now," Hedrock intruded, "has only been temporarily banished from her circle." He finished sardonically: "You have not been interested, but *that* was the result of the turmoil in the palace today. The time involved, if I may add the information is two months."

Peter Cadron bowed at him politely, then turned back to the silent men at the V-table: "Bear that in mind while I question Mr. Hedrock about his education."

His gray gaze glowed at Hedrock. "Well?" he said.

"My mother," said Hedrock, "had been a university professor. She taught me privately. As you know, that has been common practice among the well-to-do for hundreds of years, the controlling factor being that periodic examinations must be passed. You will find that I handed in my examination certificates with my application."

The dark smile was back on Cadron's face. "A family on paper, an education—on paper; an entire life history verifiable only by documents."

It looked bad. Hedrock did not need to look at the faces of the councilors to realize how bad. Actually, of course, it was utterly unavoidable. There never had been an alternative method. To have trusted to a living person to back up his identity in a crisis would have been sheer downright suicide.

People, however much they liked you, however much you had paid them, could always be made to tell the truth. But no one could ever more than cast suspicion on a properly executed certificate. Therefore—

He'd be hanged if he'd believe that they had guessed even remotely near to the real truth. They had something of course but—

"Look here!" he said violently, "what are you trying to prove? If I'm not Robert Hedrock, who am I?"

He gained a bleak content from the baffled expression that crept over Cadron's face. "That," the man rapped finally, "is what we are trying to find out. However, one more question:

"After your parents were married, your mother didn't keep in touch with her university friends, or any former colleagues?"

Hedrock hesitated, staring straight into the councilors' glinting eyes. "It fits in, doesn't it, Mr. Cadron?" he said at last in a tight, hard voice. "But you're utterly right. We lived in apartments; my father's work kept us moving every few months. It is doubtful if you can find anyone who will remember having met them or me. We truly lived a shadow existence."

There was a subtle psychological victory in having spoken the indictment himself but—Hedrock smiled grayly—if ever he had heard a damning build-up of innuendo, here it was. He grew aware that Cadron was speaking:

"—We recognize, Mr. Hedrock, that this is not evidence, nor is that what we are after. The Weapon Shops do not hold trials in any real sense. They pass judgments; and the sole criterion always is, not proof of guilt, but doubt of innocence.

"You know that, in our position, we *cannot* do other. Fortunately for our peace of mind, we have more than suspicion. Is it possible that you have anything to add to what has already gone?"

"Nothing," said Hedrock.

He was thinking: If doubt of innocence meant death then—

He stood very still, letting his mind settle around the situation. It was almost instinct, that attunement, but behind it was the synthesization of experience that recognized the possible importance of every phase of his whole immediate environment. Somehow, he had to seize the initiative, *had to!*

He saw the floor, the walls, the panel to his right—and there he paused in ironic bitterness. He had originally, by secret maneuvering, persuaded the Meteorite Corp. to take offices near the roof of the Hotel Royal Ganeel because it had seemed to him that their un-

suspected Imperial City headquarters would be safer in a building of his than anywhere else.

For his own protection, however, he had had removed out of their part of the building all those ring activators and vibratory devices which now he needed so desperately. If he hadn't had that idiotic forethought, there would now be a ring behind *that* panel and—

Peter Cadron was speaking—the charge at long last:

It was hard at first for Hedrock to keep his mind on the man's words. They seemed to move around, eluding his hearing. Or else he was too jumpy, too conscious of his own hard necessities.

There was something about dispatching the rescue force, and simultaneously setting psychologists the task of fixing the exact moment for the landing, on the basis of Hedrock's statement that the issue would be forced into the open by the empress during lunch.

Naturally in arriving at their decision, the psychologists made a swift though careful examination of his psychology chart. It was this examination that brought out an extraordinary fact.

Peter Cadron paused. His gaze fixed on Hedrock's face; and for a moment he seemed to be probing in its lineaments for secret information. He finished weightily:

"There was a variation between your courage in action and the Pp record of your potential courage. According to the Pp you would never even have considered staying for that dangerous luncheon at the palace."

Cadron stopped; and Hedrock waited for him to finish. The seconds passed, and suddenly he was startled to see that dozens of the men were leaning forward tensely, sharp eyes bent on him.

They were waiting for his reaction. It was all over. This was the charge.

For a moment, then, he felt like a man delivered. Why, it was—

The dream yielded to the immense reality of the presence of the thirty. They wouldn't be here, never would they be here, sitting in full-dress judgment, unless a great Basic of the Weapon Shops was threatened.

The Pp record technique! Hedrock tried to concentrate his mind on remembering what he had heard about the damned machine. It was one of the original inventions, many thousands of years old. In the beginning it had been similar to the Imperial Lambeth Mind Control.

There had been improvements from time to time, a widening of its scope, the power to assess intelligence, emotional stability—and other things. But it had never worried him, who had a partial ability to control his mind.

At the time of the examination he had simply attempted to synchronize his intellectual attributes with the character he had decided would best suit his purpose among the Weapon Makers and—

Hedrock shook himself like a stag at bay. Damned if he'd believe they had anything. But start talking—fast.

"So," he said, and his voice sounded harsh in his own ears, "so I'm five percent braver than I ought to have been. I don't believe it. Bravery is a matter of circumstances. The veriest coward can become a lion given the proper incentive.

"I cannot stress too strongely how great my own incentive has been."

In spite of himself, his voice was suddenly more forceful; some of the fire of his convictions, his dark anxieties, thickened and deepened his tone.

"You people," he snapped, "do not seem to be alive to the tremendousness of what is going on. What is happening is no idle whim of a bored ruler. The empress is now a mature personality in all except minor meanings of the term, and it must never be forgotten that we are now entering into the fifth period of the House of Isher.

"At any hour mighty events could erupt from the great surging undercurrents of human unrest. Twenty billion minds are active, uneasy, rebellious. New frontiers of science and relations among men are just beyond the horizon; and somewhere out of that chaotic mass will grow the fifth crisis of cosmic proportions in the history of Isher civilization.

"Only such a superdevelopment could bring the empress to such sustained, forceful action at this stage of her career.

"She said that in two months she would call me back, and suggested it might be less. It *will* be less. My impression, and I cannot emphasize it too strongely, is that we shall be lucky to have two days; two weeks is the absolute outside limit."

He was roused now. He saw that Cadron was trying to speak, but he plunged on, unheeding. His great voice filled the room:

"The entire available trained strength of the Weapon Shops should be concentrating in Imperial City. Every street should have its observer. The fleet should be mobilized within striking distance of the city.

"All this should be already in ceaseless operation. But what do I find instead"—he paused, then finished scathingly—"the mighty Weapon Shop council is frittering its time away on some obscure discussion of whether or not a man should have been as brave as he was."

He ended, drably conscious that he had not influenced them. The men sat unsmiling, cold. Peter Cadron broke the silence quietly:

"The difference," he said, "is seventy-five percent, not five. That's a lot of bravery; and we shall now discuss it briefly."

Hedrock sighed his recognition of defeat. And felt better. Wryly, he recognized why. Against all reason, there had been hope in him. Now there wasn't.

Here was the crisis, product of a scientific force which he had thought under control. And it wasn't. It had become one more of a whole pattern of superbly accurate techniques that had created a steadily widening gap between their positive menace to his person and his capacity for counteraction.

He must still try to stall along but— He listened darkly as Cadron began to speak:

"I assure you, Mr. Hedrock," the man said with quiet sincerity, "we are all distressed by the duty that devolves upon us. But the evidence is relentless.

"Here is what happened: When the psychologists discovered the variation, two cerebro-geometic figures were set up on the Pp machine. One used as a base the old record of your mind; the other took into account *a seventy-five percent increase in every function of your mind,* EVERY FUNCTION, I repeat, not only courage.

"Among other things, this brought your I. Q. to the astounding figure of two hundred seventy-eight—"

Hedrock said: "You say, *every* function. Including idealism and altruism, I presume?"

He saw that the men were looking at him uneasily; Cadron said: "Mr. Hedrock, a man with that much altruism would regard the Weapon Shops as merely one factor in a greater game. The Weapon Shops cannot be so broad-minded. But let me go on:

"In both the cerebro-geometric figures I have mentioned, the complicated figurate of the empress was mechanically woven into the matrix; and because speed was an absolute essential, the possible influence on the situation of other minds was reduced to a high level Constant, modified by a simple, oscillating Variable—"

In spite of himself, Hedrock found himself becoming absorbed. His conviction that he ought to interrupt as often as was psychologically safe yielded before a gathering fascination in the details of a science that had so greatly outstripped his capacity even for learning about it.

Graphs of brain and emotional integers, curious mathematical constructions whose roots delved deep into the obscure impulses of the human mind and body—and bloomed triumphantly into flowers of fact; flowers whose life was never lost in some vagrant breeze, some unexpected mishap, but which like some supergreenhouse development bore exactly the anticipated perfect fruit.

Beautiful but deadly fruit that seemed on the verge of poisoning him. He listened, and watched, intently, as Cadron went on with his damning words:

"The problem, as I have said, was to insure that the rescue party did not arrive at the palace too soon—or too late.

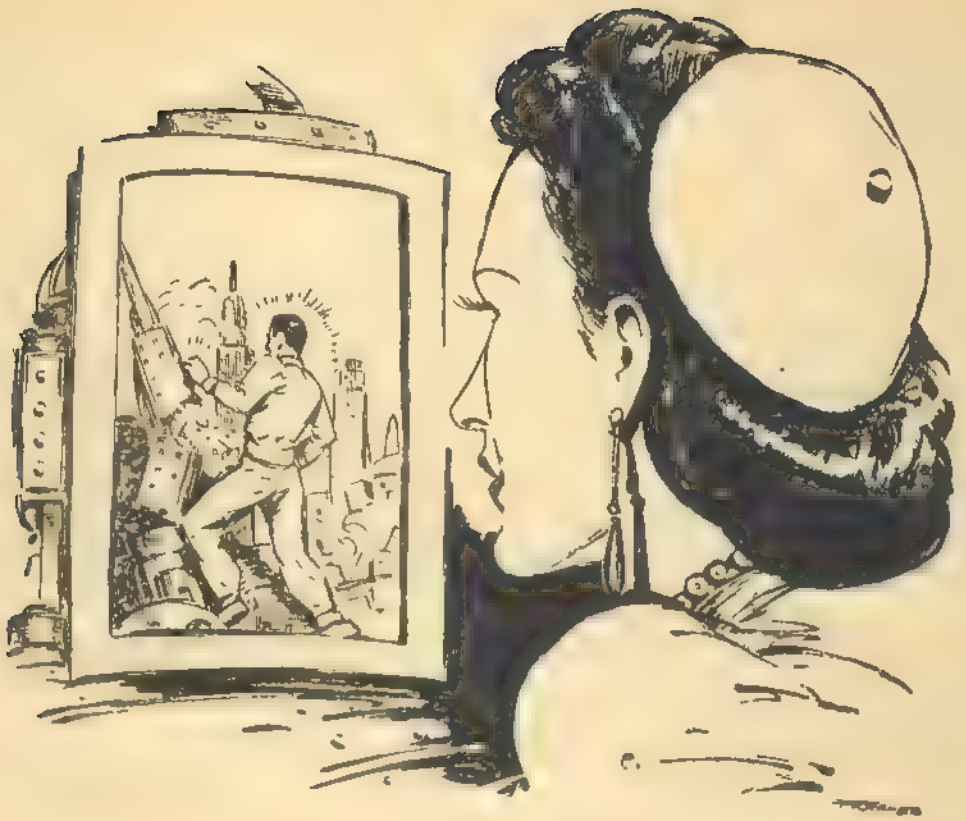
"It was found that the graph based on your old Pp proved that you would never leave the palace alive, unless an Unknown of the third order intervened in your favor. That figurate accordingly was instantly abandoned. Science cannot take account of possible miracles.

"The second projection centralized on the hour of 1:40 p. m., with a concentric error-possibility of four minutes. The landing was, therefore, effected at 1:35; the false Imperial credentials were accepted within two minutes. At 1:39, you emerged from the elevator.

"You will agree, I think, that the evidence is conclusive."

It was a positive nightmare. All these years while he had been living and planning, carefully building up the structure of his hopes, he had actually already committed his fortunes to a marvelous machine whose mindless predictions had innate in them the black character of a raging juggernaut.

What madness to have discounted for as much as a single second the greatest invention that ever was in the field of the human



mind. Distractedly, Hedrock realized that one of the councilors, not Cadron, but a little gray-haired man, was speaking, saying:

"In view of the fact that this is not a criminal case in any real sense of the word, and particularly because of Mr. Hedrock's past services, I think he is entitled to assurance that we are taking seriously what the empress is doing. For your information, young man, our staff here has been enlarged fivefold.

"Perhaps in your personal anxiety at the time, you did not notice that the elevator from the airport went down much farther than usual to reach here. We have taken over seven additional floors of the hotel, and our organization *is* in ceaseless operation.

"Unfortunately, in spite of your stirring appeal, I must agree with Mr. Cadron. The Weapon Shops, being what they are, must handle cases like yours with cruel dispatch. I am compelled to agree that death is the only possible sentence."

There were nods along the table, voices murmuring: "Yes, death—death—immediate—"

"Just a minute!" Hedrock's voice made a strong pattern above the quiet medley. "Did you say that this council room is now in a part of the hotel not previously occupied by the Meteorite Corp.?"

They stared at him blankly, as he ran, not waiting for a reply, straight at the ornamental panel on the darkly gleaming wall to his right. It was simpler than he had expected in his wildest imaginings.

No one stopped him; no one even drew a gun. As he reached the panel, he adjusted his four fingers, accurately fitted them against the panel, twisted—and the ring slid out on its hidden groove onto his index finger.

In one continuous, synchronized motion, he turned its pale-green fire on the vibratory device—and stepped through the transmitter.

Hedrock wasted no time examining the familiar room in which he found himself. It was located in underground vaults twenty-five hundred miles from Imperial City, filled with softly pulsing machines and glittering instruments—and if he was going to keep it secret he'd better act. *Fast!*

His hand streaked to a wall switch. There was a hiss of power as he plunged it home.

He had a brief mind picture, then, of all the rings and devices in the Hotel Royal Ganeel dissolving out of existence. They had

served their purpose. One escape was all he could ever hope to make from the Weapon Shops.

He turned, walked through a door; and then, at the last instant, saw his deadly danger, and tried to leap back.

Too late. The twenty-foot monster pounced on him; its sledge-hammer paws sent him spinning along one wall, dizzy, sick, half unconscious.

In a blank, terrible dismay, he tried to move, to rise—and saw the gigantic white thing darting toward him, its great teeth bared for the kill.

## VIII.

Neelan kept fainting. The agony would come at him out of a swirling world of darkness, and would grow and grow; and then abruptly night would return mercifully to overflow the pain.

He lay finally, vaguely conscious; and, far away, *the* woman's voice was saying:

"You mean—the recorder says he won't yield to any degree of torture. That's impossible. No one— Very well, take him to the bedroom—"

Her voice faded into vast distance; and there was no more direct pain, only the twitching of past anguish. When he wakened again, the woman's face came out of the mist, and she was saying:

"Do you still agree to kill Greer? If you do, all will be well."

His thought was immeasurably slow, but one fact was like fire. He had to, HAD TO get on the ship. He muttered:

"I'll stick to what I said."

"Good. But the main plan is now changed. We're going to take the tremendous risks of him getting away. As soon as you get aboard, and he is out of sight, go below, and cut the main drive from the engines. There will be an emergency drive, of course, but we shall have tractor beams on the whole ship, capable of tugging against any normal drive.

"The moment the main drive is disconnected, we will attack; Greer will naturally head for the control room, where you will seek him out to kill him, or interfere with him in any way you can. We need three minutes to blast our way into the ship. Is that clear?"

"Yes, yes—"

"You'll do it?"

The mist was fading a little more; and Neelan saw that Zeydel was standing beside the empress holding a Lambeth, its cone-shaped receptor pointing at his head where it lay on the pillow.

Neelan's eyes narrowed. Even now they were after him; and one thing was utterly clear: He couldn't in his present condition decide on the details of further promises. Therefore—

"I'll stick to what I said." He spoke doggedly. "But I'll go down to the engine room. I'll prepare for your attack."

That, at least, was true. Prepare he would.

"Oh, you—"

Above him, the empress clenched her hands; her eyes were green pools of angry frustration. Then she drew back. The last thing Neelan heard was:

"What an incredible man to come up against at such a time. It's like fate. So listen well: be prepared to contact Greer in the event that our attack fails. Tell him his terms will be met today. As soon as he recovers from his fright, he'll agree to that. But we must win. We must!"

There was a long, blank lull in Neelan's thoughts, but somewhere he discovered that he was not bound or held down in any way. It seemed a long time before realization came that there were things to do.

He sat up shakily. The movement made him dizzy, but after a moment a measure of strength came back. He took off his upper clothes, then, and studied the invisibility belt. At first his vision kept blurring, his fingers seemed inadequately muscled. But he strained determinedly, and finally the stiff catch of the buckle worked loose.

He expected the necktie-telestat to sound forth with objections, as he carefully exposed the inner workings of the belt to view, but surprisingly there was complete silence.

Neelan worked earnestly and without haste, going over the intricate design of finely woven, interlocking plates. It was investigation pure and thorough; and the principle by which the belt operated—similar to the de-lighting in artificial darkness—was important only insofar as a complete understanding of what was legitimate enabled him to search the more articulately for the bomb.

The empress hadn't said that there was an energy charge in the belt as well as in the tie. But the course of wisdom favored personal verification.

He put the belt back on finally, satisfied that

it was innocuous. But it was not until he had stretched out on the bed once more that he realized the extent of his relief. His whole being sighed with it; and it took a long moment to grasp why:

Because it left him only one thing to fight. Because from this moment he could devote every ounce of his attention to the problem of getting rid at the proper moment of the telestat-tie.

His brief flight of confidence dimmed only as he stood before a mirror examining the tie. It was a flexible, artificial-magnesium alloy, and it was a snug fit under his collar. An atomic cutter could clip that closed coil of metal but—

A thin bead of sweat trickled down Neelan's forehead. The special systems of mind training that had instilled science into his mind, and kept it there, an undiminished force, had also provided him with a sense of timing.

It was that that fazed him now. For how was he going to get hold of a cutter, clip off the tie, throw the damnable thing a hundred feet, and leap behind something big and superhard—all before an alert watcher at the other end of the telestat twitched the button that would dissolve the energy bomb?

And in addition to all that, how could he possibly climb more than three hundred feet of stairway to the control room, and launch the ship—the whole operation to be accomplished in three minutes?

It was not a matter of hoping that, at the last moment, he would perform a miracle of speed. It *couldn't* be done. Here was death unless he could think of something radically different, something—

His mind wouldn't work on that. He had a sense of ultimate exhaustion. He lay down on the bed, and he must have slept.

When Neelan wakened, sunlight was streaming through the window—and a man was serving breakfast at a small table from a steaming tray.

Beyond the man, the empress sat in a deep chair before a bank of telestats. Zeydel stood beside her, looking like a particularly uncompromising guard of honor.

Neelan sat up: and the empress said in her most golden-toned voice:

"Dan Neelan, I came personally to swear to you that the energy charge in the tie will not be exploded unless you by outrageous action attempt to defeat our enterprise. I swear further that you will not be molested afterward, but that, if all goes well, you will receive the sum of ten million credits this very day. That is my sacred word of honor."

Neelan nodded a wry acceptance of her guarantee. He was pretty sure she meant it, but there was one thing that nullified her words as completely as if they had never been spoken.

Himself. His unalterable purpose. He intended to defeat her if it lay within his power to do so. He—

One of the telestats before the empress came alive, and cut off Neelan's thought; a man's voice saying curtly:

"Your majesty, the eight one-hundred-million-cycle guns are now being floated into position under the mantle of invisibility."

"Report noted," said the empress. "Traffic is still normal, is it?"

"Yes, we haven't closed off the street yet."

"Good."

She had scarcely spoken the word, before another of the telestats broke into sound:

"Imperial majesty, the first sector battle fleet is now at stations. Nine thousand warships cruising in assigned positions."

"Splendid. Keep your ships well up, and wait for the signal. That is all."

Neelan grew aware that the empress was looking at him from half-closed eyes. She caught his glance, and said in a silken tone:

"Perhaps you are beginning to realize that I am in earnest."

Neelan was silent, as he walked over and seated himself before the breakfast table. He had listened to the staggering conversations with a sense of unreality, and only now that she had spoken did it strike him that some of this was for his benefit, and that there was at least one wrongness. He said slowly, grimly:

"Since when has it been possible to make one-hundred-million-cycle guns? I was taught that no metal could withstand such power except in a vacuum."

The empress smiled a tight-lipped smile, as she answered: "Each unit will fire one shot, dissolving as it does so. Eight units smashing at one narrow portion of wall will cause a break-through within three minutes. That is the plan."

Curiously, Neelan's mind concentrated on the cost of such weapons. But the tens of millions of credits that were automatically involved in certain functions of each unit, stultified his thought.

But he was convinced. The guns *were*

there, as stated, abnormal evidence of the forces that were gathering against him. More and more his position was—one man against the world.

A telestat broke into life: "Your majesty, an urgent news message has just come through from the Middle West. A giant human being, one hundred and fifty feet tall is destroying the business section of the city of Denar."

*"What?"*

"If you wish, majesty, I will show you the scene. The giant is retreating slowly before the attacks of mobile units and—"

"Never mind—" Her voice was cool and incisive; and Neelan could only stare at her in amazement. Empress she was now, woman of steel, untouched by surprise, like a metal spring in her reaction. The news itself seemed senseless, as meaningless as life itself. Neelan listened, as she finished her curt dismissal:

"Report later. I cannot give my attention at the moment."

"Very well."

During the silence that followed, she sat like a statue, her face whitely immobile, her eyes peering forth like green jewels. She seemed oblivious of the presence of others, as she whispered:

"Can it be some manifestation of the revolution of the Weapon Shops have been predicting?"

She shook herself; she seemed to become aware of her surroundings. She looked at Neelan calmly.

"You will have to hurry," she said steadily. "It's a quarter to eight now. By the time you're completely ready, and get over there, it will be nine o'clock."

It was. Neelan's watch showed one minute to nine, as he walked gingerly up to the door of the spaceship hangar, and rang the bell.

He stood there then, cold, trembling a little. Consciousness of death was strong in him, but it was an oddly warm sensation.

He looked up into the blue, cloudless sky. Not a ship was in sight. Of all that vast mass of waiting warships, there was no sign. The world looked lazy and peaceful, almost timeless.

Nor was there a single evidence around him of the guns that, within minutes, would unleash their inconceivable fire upon the walls of the ship he was about to enter.

He felt suddenly breathless, and not at all unhappy, a man on the very edge of eternity, peering over. The impression faded slowly. He thought finally with all his mind and all his body:

Gil, don't give up. Hang on. I'm coming. I'm coming.

There was a faint metallic click. He saw that the outer door was opening.

Neelan walked slowly through the doors. It seemed to him that a whole army of invisible men could slip in behind him during the minute and a half that the doors were set to remain open.

But there was no sound except his own. He paused, startled by the enveloping silence, and listened

Vainly. Except for the faint, faint sound of his breathing, he might have been in a tomb with the dead of the forgotten ages, gone forevermore into the mists of oblivion.

He half turned as he reached the third door, as if to look back. And he was still twisted like that when he entered the control room. Twisted away from the great control board to the right.

Whoever was at the other end of the telestattie wouldn't be able to see that no one was at the control board, or even that this was the control center.

A faint wheezing sound made Neelan turn completely. The doors were closing.

He had timed his pace well. Except for Greer, he was alone in the ship, safe except for a damnable telestat-tie that carried an atomic bomb.

If only he had known yesterday what he knew now. If he hadn't been so blindly obsessed, so remote from the greater realities that had, he could see now hopelessly, clamored for his attention, literally thrust themselves at him.

All the universe to feed man's vaulting spirit, Gil's life—his to give and his to save; and he had been like some mindless fanatic, almost willfully heedless of the power that was his for the taking.

Silence.

He thought: What would they be wondering? The empress, of course, would be there before her bank of telestats, keeping her in touch with the men on the battleships and the man beside the invisible cannon. And all of them would be waiting.

So far, his pause would seem natural. Why

shouldn't he wait for Greer to show himself, and speak?

His own plan hadn't exactly included a halt here. But then that plan itself was a vague hodgepodge, dependent on unfolding opportunity and will to endure, and overwhelmingly upon grim determination to win.

Nothing mattered but that. Nothing.

He began to walk toward the stairway to the extreme right; and he was halfway down the first leg of steps when a voice whispered under his neck. He was so intent that he jumped, and it was a moment before he recognized that it was *she*.

"What's the matter? Where's Greer?"

Neelan whispered furiously: "How should I know? For Heaven's sake, your majesty, he may be listening."

She was cool. "That's impossible. All these ships are built to standard specifications. There are no sound devices on stairways. But proceed! You are heading for the engine room?"

"Yes," Neelan whispered. "Yes."

In spite of the fact that the situation hadn't really changed, Neelan felt shaken by the interruption. For it showed that the remarkable woman had now nerved herself to take risks.

The words had brought with them, too, something of the deadly will that was out there, lusting to break into this ship, the masses of men and machines waiting like destroying juggernauts, like armies of old poised to plunge into bloody battle.

For a moment it seemed incredible that one woman could set so much power into motion, could by her slightest act influence the entire future of the world.

If Gil was right, there would be no repetition of this invention. Here was the end or the beginning of life. Here was—

He had been descending steadily; and now he saw that he was in the repair shop above the engine room. Instantly, all thought except his own immediate purpose washed from his mind as if it had never been.

Get a cutter, an atomic hand-cutter for himself—while seeming to concentrate on lowering a great cable-cutter down to the engine room.

There was a hand-cutter, he saw after a frantic visual search, on the bench near the great, fenced-in well that looked down on the pack of engines below.

It was the work of a few minutes to maneuver the mobile crane, so that it rolled weightily up to the bench, and from that position lowered the ten-foot cable-cutter down the well directly over the mound of metal that concealed the main drive.

The big cutter safely set down, Neelan leaned against the bench, took out his handkerchief, and wiped the sweat off his face.

He was shocked to discover that his face was wet with perspiration. It took several seconds to clear off the cold dampness; and every instant his fingers were fumbling on the bench behind him.

He gasped with relief as his hand closed convulsively over the priceless tool. It was at that tremendous moment that the empress hissed at him:

"What are you doing? Why the delay?" She paused; then: "Something is wrong. Did you kill Greer yesterday? Is that what you were hiding?"

She had, Neelan realized grayly, at this penultimate hour struck fire.

He could almost see pictorially how she had inevitably arrived at the conclusion. Everything fitted: the way the doors had opened—and shut behind him—automatically; the nonappearance of Greer, the way he, Neelan, had worded his promises of the night before, and his refusal to go beyond them.

A single reaching of the mind, a mental flash of comprehension. *She* would need nothing more.

But she couldn't be sure. Therefore—

"*Sssshh!*" Neelan whispered huskily. "I think I hear something."

The wretched thing, then, was that he stood there. Now that the time had come, his muscles seemed immovable, his mind lost in funk. The final action, and what lay beyond, seemed suddenly too great an obstacle for a single human being to overcome.

The empress was speaking again, in an intense whisper:

"Dan Neelan, at this final hour, I make you another appeal. No matter what you are hiding, it doesn't matter. No matter what you want, I shall accede to it, provided it leaves me in full control of the ship and the invention. If there is any truth in what I have just said about Greer being dead, yield verification, and you shall have one billion credits within the hour. Do you realize how much money that is? Can your imagination conceive the wealth that will be yours?"

And still there was nothing he could say. Her one proviso—"*Leave me the ship*"—put their two purposes as far apart as the two poles of the galaxy.

It was that opposition, so fundamental as to make all argument meaningless that released Neelan from the thrall that held him. Like mechanical springs, suddenly set free, his arms jerked up behind him. With one hand, he caught the metal of the tie, where it came around the back of his neck under his collar.

At that last instant, it struck him that he ought to speak, to say something—hold off for fractional seconds the demoniac woman out there, who must be on the very verge of decisive action.

"Your majesty," Neelan gasped. "You're quite mistaken. Greer is alive. He—"

"Then what are you waiting for? Hurry! Cut the drive cable. Are you mad to stand there? *What are you doing?*"

It was, Neelan reflected grimly, a good question. He had brought up his right hand, which held the small cutter, and adjusted the power edge over the metal band of the tie. There was a tiny physical blow, as he pressed the control; and then—

"Break in!" the empress was crying, her voice like a deep violin note. "All forces act. Break in!"

Convulsively, Neelan snatched the tie, flung it down the well into the engine room, and threw himself flat on the floor.

There was a red, billowing flare of fire.

Instantly, he was on his feet, racing for the stairs, exultant because—because the first cannon blow had yet to come. Surely, oh, surely, he could muster the physical strength for three hundred and sixty feet of stairway, and do it in less than a hundred and eighty seconds of sustained climbing.

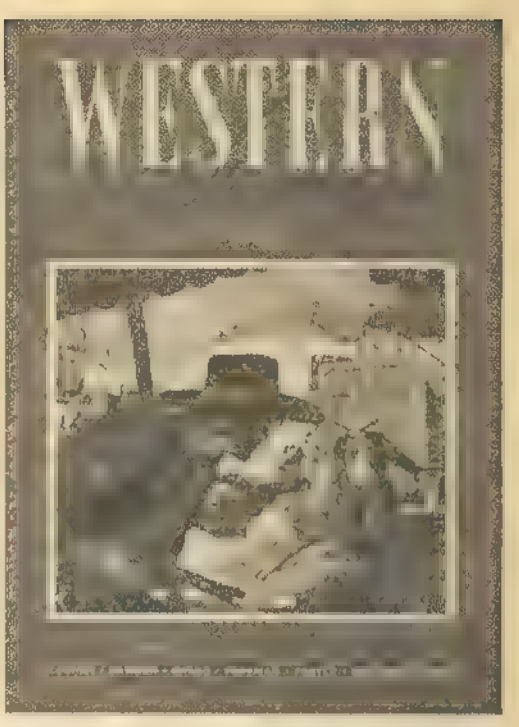
Three minutes, the empress had said, three—

The first shot struck then. It shook the ship. It was violent beyond his wildest preconception. It brought a moment of horrible daze, and a mind-racking thought:

He had forgotten concussion.

He raced on up, up, the appalling fear already in his heart. The second titanic shot sent him reeling back. But he recovered, and plunged on, conscious of lassitude.

The third shot raged; and blood spurted from his nose; a warm stream trickled out of his ears. The fourth shot—he was dimly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aware that he was nearly halfway up those endless stairs—crumpled him in a heap. He half rolled down a whole section of stairway; and the fifth shot caught him as he was staggering erect.

He knew his defeat now, a sick and deadly knowledge, but he kept moving his legs, and felt amazed when he reached the next level. The sixth intolerable explosion caught him there at the head of that long stair; and sent him spinning down like a leaf engulfed in a storm.

There was a door at the bottom; and he closed it with pure automatic intention, mindlessly. He stared dully as the great door lifted off its hinges, grazed him as it fell, and clanged to the floor. That was the seventh shot.

Like an animal now, he retreated from pain, down the next line of steps, instinctively locking the lower door. He was standing there, infinitely weary, half leaning against the door when the shouts of men roused his stunned mind.

Voices, he thought then, inside the ship. He shook his head, unbelievingly. The voices came nearer; and then abruptly the truth penetrated.

*They were in. It had taken only seven shots.*

A man shouted arrogantly from the other side of the door, where he was standing: "Quick, break it down. Kill Neelan on sight. That's orders."

The empress had the ship.

## IX.

Neelan began to retreat. It was a slow business, because his mind wouldn't gather around any one thought, and his reflexes were all shot to pieces.

And that, he thought in a paroxysm of coherence. was almost literally true. He had been reduced to an inchoate nervous organism by the greatest concentration of energy fire ever leveled at a machine containing a man.

His knees trembled, as he kept on going down the stairs. Down, down—the clumsy feeling came that he was climbing deeper into his grave.

Not, he realized grayly, that there was much farther to go now. The storerooms were past. Next was the insulation room, then the repair room, then the engine room, then the drive chamber; and then—

*And then—*

Neelan's brain skittered there like a crazy thing. The pressure of the thought was so great that his whole being convulsed; and he was himself, complete with purpose, will—and hope.

Hope! It surged through him, a tidal wave that burned along his tortured nerves, warming his body. Hope because—

There was a way. A way so simple that it seemed incredible that he hadn't even thought of it before. Although that, too, was explicable, actually. Every drop of blood and energy in him had been concentrated on getting the ship, a very drumbeat of determination, of co-ordinated action, and of courage so great that it was almost impossible to realize that he had been the one to display it.

The ship was lost, of course; and Gil, and those other poor devils four and a third light-years away were lost. And all the billions of human beings who might have carried the torch of civilization to the farthest stars of the universe—their chance, too, their destiny, their hope of greater happiness was gone, unless—

Neelan smiled bleakly at the impossibility, but the thought stayed with him, and gradually formed a remote spur to his weary muscles: Everything that mattered was lost unless the empress, at this moment of her victory, gave up the secret willingly or by compulsion.

He reached the engine room, and forgot all else but the work that had to be done. It took a precious minute to discover which of the motors was working, so slight was the drain of power that went into the ship's lighting system and other power functions. During that minute the floors shuddered as another of the doors he had locked went down with a distant clang before the hissing roar of a mobile unit. Instantly, the shouting of men came nearer.

With a grim patience, Neelan began to pull switches. First, went the telestat control. At least he would no longer be watched from hidden 'stats. All the upper lights went next. It should take them several minutes to get more lights. Meanwhile—

With a swift, thrusting motion, he reached under his shirt, and switched on his invisibility belt. Nothing happened, but—he smiled grimly—he had expected them to shut his power off. The answer was to tune in on *this* engine.

He grasped the essential dial, twirled it. His

belt tugged like a motor, and the whole scene changed subtly. Colors blurred, transformed curiously; metal-gray became darker, white shaded.

There was a rule that a person going invisible should pause for sanity's sake to let the body adjust. But he had no time for that. With frantic fingers, Neelan jerked the switch that locked the tuning dial in place, then hastily unscrewed the switch and put it in his pocket. The screw hole of the switch he seared with an atomic solder beyond all immediate use.

He simply stuck the solder iron into the socket of the engine control, and left it there, burning away, making it utterly impossible for anyone to shut off the engine in the near future.

He had already visually located the six-foot drill he wanted; he floated it out on its anti-gravity base, pushing it urgently down the two flights of stairs from the repair room, where it had been, down past the engine room, into the great drive chamber that was the final room of the big spaceship.

And there, in spite of himself, in spite of the desperate urgency, Neelan paused and stared like a sick man at what must be the stellar drive itself.

Here was the treasure that all the fighting was about. And the mere idea of passing it without striving even now to snatch a clue that would enable the Weapon Shop scientists to re-invent, was impossible.

Yesterday—how long ago that seemed—he hadn't so much as come down to this room. Instead, he had wandered about like an egotistical idiot, gawking knowingly at all the things that didn't matter.

Trembling, Neelan snatched the transparency bar of the giant drill, and focused its penetrating light at that thirty-foot-thick drive shaft.

He saw dark mist—and groaned with his failure. The metal was too hard, too thick. There were too many interlayers and reflectors. No known transparency would ever so much as approach the core of that drive.

Defeated, Neelan whirled and began to run, pushing the drill which, weightless though it was, nevertheless offered a "mass" resistance to his straining muscles.

He got through the first door of the bottom lock, then the second, then the third—and then he stood there gulping in wild surmise.

He had been gathering his reserves of strength and will for the job of drilling a six-foot hole through the earth on a steep slanting thrust for the surface.

He didn't have to. The hole, the passageway, was there. A line of dim ceiling lights made a straight but upward slanting path into the distance.

And there was not a second, not an instant, to think of explanations. In a single twist of synchronized movement, Neelan grabbed the transparency bar, squeezed past the now unnecessary drill, and raced along the tunnel.

It was much longer than he would have had time to drill. The angle of ascent was only about twenty degrees. But actually the greater distance was all to the good. The farther he got away from the ship before emerging into the open, the better.

He reached the end suddenly. It was a metal door; and, using the transparency, he could see that beyond it was an empty cellar. The door had a simple latch, that opened at his touch and closed behind him like amorphous metal sinking tracelessly into a solid wall.

It was the perfection of workmanship that startled him. Neelan paused, tensely, inside the cellar, and studied the door. There was an implication here that Greer had been back from Centaurus for a long time. So much preparation for his negotiations with the empress, this outlet, and that secret address at the Trellis Minor Building, must have taken weeks to arrange for. Or was it possibly—

Neelan's face cleared. Of course. That was it. Not Greer, but Kershaw and the others, had built this. They, too, had been cautious about their contacts with the outside world.

It was possible that Greer had not even known of this passageway. In fact—Neelan felt suddenly positive—the man would never have left him alone in the engine room yesterday morning, so near an exit, if he had known.

The other, the telestat contacts with the outside world had probably been handed into Greer's control as general handy man by those brilliant nitwits, Kershaw and Gil, who thought of every precaution against outside interference, but never once cleaned their inner house against back-stabbing schemers.

The thought, now that all was lost, was too bitter to hold even for a second. Depressed, Neelan headed for a set of stairs to his left. Halfway up, the stairs branched. The left way led up to a rather ornate door, beyond

which his transparency showed a vacant kitchen; the right way—

Very carefully Neelan laid the transparency down on the steps. He wouldn't be needing it any more. He straightened then like a man bracing himself. Finally he opened the second door and stepped into bright sunlight.

He was in the back yard of a large, vacant house. There was the usual green wonder of lawn, the perpetually flowering garden, the carplane garage, and a high fence with a gate.

The gate opened easily from inside onto a back-alley boulevard, the kind where the sidewalks hug the sides of the street. Farther along, Neelan could see a broad thoroughfare.

He hurried toward it, anxious to identify it so that he could judge how far he was from the spaceship. Knowing where he was would give him a better idea of what he must do, *could* do, next.

There would be a cordon of guards. But just how far they extended from the center of operations, and what degree of watchfulness they were exercising, was another matter. If they had invisibility viewers—

They did. There was a uniformed guard at the corner, and he wore the glittering viewer headpiece. He waved at Neelan from a distance.

"How're things going?"

"We're in!" Neelan called. "Keep your eyes peeled."

"Don't worry. There's a solid line of us out here."

Neelan turned away, shuddering, and walked hastily back the way he had come. Trapped. The streets would be covered for blocks; and, in minutes, a yelling crew would smash the last of the hard doors that barred their way in the spaceship, realize what had happened and the search with its certainty of capture would be on.

Or worse still, perhaps they were already by the final barrier, and in minutes would break from the house, where the tunnel ended; and, seeing him, swoop for the kill.

He began to run. He vaulted a high fence into another back yard. There was a line of viewer-helmeted men along the front of the house. But now that he was heading for the ship, with the fantastic hope it suddenly offered, the spirit of fear and of retreat that had made sodden inroads on his courage faded like an evil dream.

Nobody tried to stop him; and, after a taut moment, Neelan smiled with a dark moodiness at the psychology that permitted a man to head toward a center of infection, but not away from it.

He crossed boldly to the corner of the street, from where he could see the needle-shaped hangar just down the block. There was a store at the corner with a loud-speaker that blared suddenly:

"A special statement has just been issued by the Weapon Makers' council denouncing the hundred-and-fifty-foot giant, who has now devastated the business districts of the cities of Denar and Lenton. The Weapon Makers state that the rumor that the giant is a Weapon Shop machine is absolutely false, and they emphasize that they will do all in their power to help capture the giant. As was reported earlier, the giant ran—"

Neelan pressed on. The words scarcely touched his mind. He felt a vague shock at the realization that he had completely forgotten about the meaningless titan with his seemingly senseless program of destruction.

But that was all. He hurried on, shaking the last wisp of the impossible picture out of his head. He reached the ship. No one tried to stop him, as he climbed gingerly through the jagged gap the cannon had made, and so into the control room.

The lights were on; that was the first thing Neelan noticed. The lights that he had turned off in the engine room were on.

The hunters had reached the engine room.

Then why wasn't there a surging tide of men exploring every nook and cranny in the ship? Neelan grew as taut as strained wire with the thought, then slowly relaxed before the fact: Men stood around in the control room. Some of them wore the helmets, but though they glanced at him there was not even the beginning of suspicion.

To them he was just one more member of the plain-clothes secret police, wearing an invisibility belt.

They were too long away from battle, these men; too many thousands of years had passed since the Isher Empire had engulfed the solar system and ended all internecine strife, and ended, too, the peculiar abnormal alertness that went with it.

The existence of the Weapon Shops had kept the army alive, but being an officer or a soldier had for ages been one of the sought-after sinecures by all the ne'er-do-wells who

had the pull or the bribe money.

And here they stood, and here they sat, idle-brained morons, waiting for the silly business to get over with, so they could go back to their mistresses and their games and the easy routine of their existence.

*Crash!* The sound came from deep in the ship and galvanized Neelan. *That must be the door to the drive chamber.*

Incredibly, his freedom was just now being discovered. In seconds, the alarm would clamor forth. Therefore—

Neelan walked without haste toward the stairway, jostled past several men waiting there, and began to climb up. It was as simple as that. There were men on each level, but they didn't seem to be guarding anything. Briefly, Neelan had the distinct conviction that they had come up here to avoid any possible fighting.

He forgot them, as his swift search of the lifeboat revealed that it was untenanted. With a sigh, he sank into the multipurpose chair before the control board, drew a shaky breath, and pressed the launching lever.

Like a ball rolling down a glass incline, the little ship slid up into the air.

The old and wonderful city, seen from the height of half a mile, sparkled in the sun. It seemed very close, some of the spearheads of buildings almost scraping the bottom of his ship, as he flew.

Neelan sat almost without thought. His first wonder that the warships had not attacked him had already yielded to the belief that they were on the lookout for an eight-hundred-foot spaceship; this tiny craft resembled at a distance a public carplane, or a dozen types of pleasure craft.

His purpose, too, was a remote appendage of his mind. He was going to contact the Weapon Shops.

It was a dark spot on the upper rim of the rear-view 'stat that brought Neelan jarringly out of his almost mindless lassitude.

The spot hurtled down out of the blue, became a ship, became a thousand-foot cruiser; simultaneously, his general call 'stat broke into life. A rasping voice barked at him:

"Didn't you hear the universal order to

ground? Carry on straight ahead, stay on your present level till you come to the military airport beacon due east. Land there, or be blown to bits."

Neelan's fingers, reaching for the white accelerator, froze in midair because—

The command showed no suspicion of his identity.

His gaze flashed to the telestat plates again and the truth burst upon him. Except for the cruiser, he was alone in the air. All traffic *had* been forced down.

Was it possible that no one had yet glanced into the lifeboat cradle and noticed its absence?

The thought came then, for the first time, sharp as a steel splinter, that this was the relation-factor of the curious Weapon Shop talk about revolution. In spite of all her energy and will, the empress could only act through others; every command she could utter must take a feebler and feebler status as it penetrated into the night of self-centered minds that surrounded her.

Neelan held his ship steady, and sat there toying with the idea of actually landing at the military field. There must be a very swarm of planes down there, and he might conceivably lose himself among them. He—

A grim smile touched his lips, as he recognized the plan for the heady madness it was. They wouldn't be as dumb as that. The moment the news was flashed about the missing lifeboat, somebody in the cruiser would remember the lone ship that had been herded toward the field—and that would be that.

Neelan flashed a frowning glance at the cruiser on the 'stat plate. It showed directly above him, and startlingly close. Too darned close. His eyes narrowed. It blocked an entire section of the upper sky from him and—

He realized the truth, as a second cruiser slipped down to his right, and a third cruiser slid to his left; and a small swarm of destroyers rocketed into view behind and in front of him.

The first ship, in almost hugging him, had screened the approach of the others. And there was not a fraction of doubt that, whatever the army might be, the fleet was not so dumb.

The funny thing was that he felt nothing. He seemed beyond emotion, fear, or any sense of desperation. There was only the reality and the action he *must* take.

A second time, his hand closed toward the white accelerator, clenched it and then paused as the long, patrician face of the empress appeared on the general call plate. Her gaze flashed toward his fingers. She turned pale.

"Wait, Dan Neelan!" Her voice was low and intense. "Think before you commit yourself irrevocably to ruin. My offer is still open. Your courage, your audacity have won you this final chance. Simply land that lifeboat, as directed and—"

There was a clash of interrupting sound; and then a strong, clear, ringing man's voice resonated into the control cabin:

"Neelan, we have just learned of your earlier visits. And our No-man, Edward Gonish, has just discovered that interstellar travel is at stake! Weapon Shop warships are coming. In two minutes, you will have absolute protection against any power. Hang on!"

The man's voice seemed to fall away, as he finished; and then there was the empress, calm now, steady as a steel bar:

"Destroy him!"

Two minutes! The thought came to Neelan as from a great distance. Two minutes was immeasurably too long to wait for succor in this frail armored craft.

For an instant, then, he sat smiling gravely at the white lever on which was engraved the words: "INFINITY DRIVE." The smile faded. With a touch of his foot, he tilted the ship toward the southern hemisphere in the general direction of where he had roughly figured Centaurus to be—and pulled the lever all the way over. "Gil," he thought, "Gil, old man, I'm com—"

There was a blow as from a sledge hammer.

## X.

The morning dragged. She paced the floor of her office in front of the mirrors that lined the walls, a tall, handsome young woman.

She thought once: "How strained I look, like an overworked kitchen maid. I'm beginning to feel sorry for myself and all the hard things I have to do. I'm getting old."

She felt older. For the dozenth time, she turned on one of the bank of telestats and stared at the men working in the drive chamber of the Greer spaceship.

She had a frantic sense of wanting to shout at them, to urge them to hurry, *hurry*. Didn't they realize that any hour, any minute, the Weapon Shops might discover where the ship was hidden, and attack with all their power?

A score of times during that long morning, she thought: "Destroy the ship now, before it's too late."

But each time she caught that desperate defeatism with a tight-lipped resistance, the deadly consciousness that the House of Isher could not afford to destroy such a secret. Some day, it might play a vital part in preserving the Imperial House from resurgent enemies.

She smiled bleakly at the intensity of her indecision. And there was no doubt in her mind, no doubt at all that, so long as the ship remained in existence, the hours would seem long, the Crown would be in mortal danger. As it was—

With a nervous flick of her finger, she turned on her news 'stat, and listened to the clamor that roared out at her:

"—Giant has again appeared. . . . Weapon Shops charge that the empress has secret of interstellar travel. . . . Giant destroying. . . . Weapon Shops denounce giant, and demand that the empress release to the people the secret of—"

She clicked it off, and stood briefly startled by the sharp silence. After a moment, she felt better.

They *d'dn't* know. That was the essence of the reports. The Weapon Shops didn't know the secret. It was true that one of their incredible No-men, Edward Gonish, had divined what she had.

But too late. Minutes and minutes too late. That was the reality behind the barrage of demands they were making, the wild fury of their verbal attacks. As soon as the ship was destroyed—she felt another flare of anxiety—there would remain the one doubtful point, one man—the incomprehensible Dan Neelan.

The thought was like a signal. Her buzzer sounded; a woman's voice said:

"Chan Boller, the physicist, to see you, your majesty. You said—"

"Yes, yes, send him in." She wondered if she sounded too eager.

Boller was an intense young man with dark eyes and a crisp manner. "I have, your majesty, completed the report on interstellar travel, for which you asked."

He stopped and stared at her sharply; and the thought came to her that he knew all about the news flashes—who didn't?—and that he was wondering how much truth was in them. Her green eyes measured his coolly.

"Go on," she said.

She listened intently, as he began, pushing the sound of his voice away from her thought, ignoring even the exact words, letting only the meaning come through.

Alpha Centauri, the physicist explained, was about four and a third light-years from Earth. It was a four-star system, and it was known to have planets. The fastest ship built to date could cover the distance in about a hundred and thirty years, or an average of five hundred miles a second. Such a flight had never been attempted.

To accomplish the journey in eleven days, "the figure your most gracious majesty mentioned," would mean an average speed of twenty-eight million miles a second. The effect on the human system of the full acceleration involved, given the present imperfect anti-acceleration efficiency of ninety-nine point nine percent was impossible to evaluate.

"Impossible!" the woman ejaculated with a sharp dismay.

Boller explained: "The difference between one hundred percent and ninety-nine point nine percent is .0000000 plus with the one swimming somewhere short of infinity, but just where it is arithmetically impossible to state."

But it would be a factor under really high accelerations, particularly as even the strongest men died from the shock of less than fifteen gravities.

As for interstellar navigation, that required a known fixed point as a base. Once that contact was lost, so was the ship—

When the physicist had gone, she sat with her eyes half closed. Neelan was dead, or lost. During the two seconds that his little ship had been within range of her telestat, she had seen that he had become unconscious the moment he jerked the white lever on his control board. The acceleration pressure that had produced the unconscious state would continue for an indefinite period. Accordingly—

Let the Weapon Shops rave and rant on the airways. The House of Isher had survived greater storms than this. The only question now was—

She turned on the telestat connecting her with the Greer spaceship. But the men were still working in their laborious fashion.

The greatest danger remained.

It began to work on her mind again. The mental picture of the ship and the disaster that would follow its seizure by the Weapon

Shops, stayed with her as she went to the eleven o'clock cabinet meeting about the giant.

It was that fear in the back of her thought that made her mood chilling, as she listened to the latest reports. The giant himself was an unreal figure. She had watched him twice in the 'stats in a blank wonder, and she couldn't concentrate on the idea of the special danger he represented.

There was only the ship.

She saw that the councilors were wary and soft-spoken. They acted as if she were about to explode.

It had never struck her before what a barrier of fear existed between herself and even these high officers. Abruptly, that was startling. She pictured herself alone in the world, served by fools and cowards, who would turn against her if ever that intangible force which created an heirarchy was subjected to strong enough blows.

Rats, she thought in a flame of anger, damned scurrying rats! She flared finally:

"But what's being done? All I hear when I turn on the 'stat is a babble of commentators vying with each other to spread reports of ruin, and to give out Weapon Shop propaganda. Stop it. Take control of all public communication. Organize a campaign of denial of the Weapon Shop charge that I am withholding the secret of interstellar travel, and launch counterpropaganda accusing them of revolutionary intent. Make a blanket charge that the giant is a tool of the Shops, and simultaneously keep asking the giant what he wants."

She stalked out of the meeting. When she reached her office, the telestat was barking that rioting had broken out in the devastated cities, and that people were surging through the streets, yelling for the secret of interstellar travel.

Her lip curled. The silly fools! Didn't they realize that a city could be built in a week these days? Next thing they'd be hanging her in effigy.

After a moment, that hurt. She bit her lip, and because the worry was real, turned on the 'stat plate showing the giant ravaging a city street.

He was like a gigantic madman, a juggernaut; and she stared at him in purest fascination of horror, almost disbelief. Buildings crashed before his incredible advance. He shone in the sun like a monstrous knight in dazzling armor.

As she watched, a destroyer flashed near him, firing with all forty of its guns; and the flame splashed off of him in an incandescent chromatic fury, as if he were a solid energy screen in himself.

But she noticed with narrowed eyes that, after the attack, he stepped aside behind a tall building; and, as the destroyer flashed back, partially crouched behind it. Baffled, the ship refrained from firing.

It returned a minute later with two others, but the giant was farther away, a trail of destruction behind, a devastation of shattered buildings. He held up a small shop between himself and the ships' fire, and seemed immune and even unaware of the spumes of energy that bounced onto him.

The woman thought: "He doesn't like direct fire, but he can stand it. Indirect energy doesn't bother him at all."

With a shudder, she snapped off the 'stat and the scene. She sat for a moment, fighting to regain her self-assurance, and finally called up Prince del Curtin's apartment. She said dryly to his anxious greeting:

"If the giant and the Weapon Shops are not the same, at least they're working together beautifully."

"I'm on my way to lunch, Innelda," the young man answered. "Are you coming?"

She was surprised. "Is it so late? But no, I'm having lunch brought here. I'm waiting for word about . . . about something."

"Did you call me up for a reason?"

"Yes. Before you go to lunch, commandeer telestat space for a statement in my name to the effect that all devastated areas will be rebuilt under a financial policy to be announced later. Be reassuring. You're well known, well liked. It should go over nicely."

"Fine!" He looked at her intently. "See here, Innelda, there are lines in your face. You're not letting this get you going."

"I've never," she replied, "played a more careful game."

A few minutes later, she listened to his statement, and smiled with pleasure at his earnestness of manner, his fine bearing. Why not he, she thought tensely? Nothing would have a greater effect on the present crisis than a swift but imposing marriage with its certainty—

She paused there, frowning with the memory of Dr. Neel's blunt words about just that subject. The old fool! Her lips came together

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defiantly; icily she finished the thought:

—*Certainty* that there would be an Isher heir within a year.

After a moment, she sighed her rejection of Del Curtin. Captain Hedrock had been right when he had said that the Imperial family did not commit racial suicide even by degrees, not knowingly anyway. Long ago, she had decided that the prince was too closely related to be eligible. She mustn't allow herself to be stampeded by events into marrying even her likable cousin.

Actually, there was no one yet unless—

She shook herself. Ridiculous. The man was simply a clever, presumptuous interloper. Even now it was difficult to grasp why she had let him get away with as much as she had.

An automatic glance at the 'stat, which was attuned to the Greer spaceship, jarred her mind back to her basic danger. For a long minute, she stared at the uncompleted work. Then, trembling, she broke the connection.

Like a nightmare, she thought, this waiting. She'd never sleep soundly again, just thinking of these hours of waiting.

She ate a sandwich, and drank a glass of something that seemed tasteless; that was all she remembered of it.

It was heartening to listen to the early-afternoon news. It was more reassuring, scarcely a mention of the giant, and everything about the Weapon Shops was against them. She mustered a wry smile. How low she had sunk when her own propaganda could cheer her up.

But it did; so much so that her nerves quieted sufficiently for her to feel up to an interview she had been putting off all morning. The interview of Greer.

She sat cold as rock while the frightened wretch poured out his story. The man was almost beside himself with terror, and his tongue kept running off into pleas for mercy.

For a time that didn't bother her. There was only the thread of his tale about Kershaw and Neelan and—

*And Neelan!*

She sighed her understanding. What an impregnable wall of purpose she had smashed up against! And what a man! What a lion of a man!

Within half an hour of boarding the spaceship he had had control of it. It had not been his fault that he had not suspected the ramifications of plotting and scheming that were going on. No one could have done more about it than he when he finally did discover it.

She came out of her reverie, said softly: "And where did you leave Kershaw and the others?"

The man broke into a frenzy of babbling, something about there being seven habitable planets altogether, three of them lovelier than Earth— "And I swear I left them on one of those. They'll be all right. The first ship will pick them up. All I wanted was to get back here and sell the invention. It's a crime of course. But these days everybody's out for himself."

She knew he was lying about where he had left the men. She felt cold and merciless. People who were afraid always did that to her. She had a sense of loathing, as if something unclean was near her.

It didn't really matter whether such people lived or died; and he probably knew more than was good for her; so—

She hesitated in spite of the simple logic, and the simpler impulse involved. It took a long second to realize why.

It was because—because, fantastically, she was afraid too. Not in the way he was. Not for herself. But for the House of Isher.

It was strange to sit here and admit that fear to herself. Almost repellent to have a sense of kinship with this creature who had been blatant and threatening when he was safe behind a fortress of steel and latent velocity, and now shivered for the rag that was his life.

She shook herself. "Take him back to his cell," she said. "I shall decide later what to do with him."

But she knew that she was going to let him live.

Blazing contempt burned in her at the weakness. She was become one with the lurking beasts of the field and the mobs that raged through the streets of giant-ravaged cities, panicky fear of the future in their hearts.

What was it the first Isher had said in his speech to the army of freedom on the morning that he was crowned emperor of the world: "A ruler must be like the wind, like Nature herself, immune to all the softer music of the heart. Sometimes, great cruelty to the few will save a million lives as we soldiers have discovered. The quality of mercy can be strained in dealing with individuals to the radical disadvantage of an entire race."

Those of course had been turbulent times

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but— Her personal 'stat buzzed. She clicked it on; and her eyes widened as she saw that it was Admiral Dirn.

"Yes," she managed to say finally, "yes, I'll be right over."

She climbed to her feet with an unnatural sense of urgency. The spaceship was ready, waiting now for her to drain its secret, but— in an affair like this, with the mighty Weapon Makers opposing her, one minute could be too late.

She almost ran for the door.

The Greer spaceship—she continued to call it that irritably for want of a better name— seemed a tiny thing in that vast military hangar. But as her carplane with its attendant patrol vessels flew nearer, it began to take on size. It towered above her finally, a long, mottled-metal, cigar-shaped structure lying horizontally on the cradle in which it was berthed.

She could see the gaping holes where the big energy guns had smashed through to conquer for her.

She forgot that as she climbed into the control room. Now that the ship was horizontal, the stairways had automatically drawn back against the wall; and it didn't take long to walk the four hundred feet through door after shattered door.

Her eyes studied the gigantic drive shaft. She saw that the plates had been loosened but not removed; and after a moment she looked questioningly at the uniformed officer who stood a respectful distance behind her. The man bowed.

"As you see, your majesty, your orders have been carried out to the letter. Nothing inside the drive has been touched or seen; and the workmen, who disconnected the plates are the ones who were chosen by you personally from case histories submitted this morning. Not one has sufficient science knowledge to analyze even an ordinary drive let alone a special type."

She nodded, then allowed herself a smile, which she tried to make warm.

"You have done well, admiral. You will receive a bonus of one million credits."

His pleasure gave her a brief fillip. Then he was speaking again:

"Not one of these men has been allowed near a telestat all day. They are unaware of the turmoil outside."

"Good. Send them in as you go out."

For a minute, then, she was alone. She stood, a faint smile on her long, Isher face, content growing into her tired body.

It shouldn't take too long. The men who, millenniums ago, had planned the education of the members of the Imperial family had rightly judged that no ruler could survive in the age of science without some course of training that would synthesize all knowledge and discovery into one brain. The training had evolved very slowly. It was far from perfect. Captain Hedrock had told her that it was similar to that of a Weapon Shop No-man, resembling the latter much as a caricature resembled a photograph.

It was a bitter comparison, but she still felt pleased with it. Hedrock had—

Her mind paused. She frowned. There she was again thinking of that curious man.

A sound interrupted her. She turned, and saw that a troop of men was coming in. They all saluted; she nodded, flashing her public smile.

The men, she saw, had their orders. They began to remove the loosened plates with a quiet efficiency. In two hours the job was done. The secret of the drive was carefully integrated into her brain.

She stood finally behind a ray shield watching an energy gun dissolve the drive core into a mass of sagging, then molten metal. Her patience had no end. She waited until there was a splotchy mound of white-hot metal on the floor; and then, satisfied at last, climbed into her carplane.

Dark clouds rode the late-afternoon sky, as she returned to the palace. A minute after she reached her office, her private 'stat winked on. It was Prince del Curtin, looking and sounding very worried.

"Innelda, have you seen the latest reports?"

She countered: "The news doesn't seem to be so bad."

"Good heavens, have you been listening to that dish water of propaganda the Department of Information is turning out? From that point of view our situation is perfect. It's the giant."

She felt a sudden emptiness, a dizzy wonder: Was it possible that in her absorption with the ship, she had actually been giving her attention to the lesser of two evils?

It struck her that she had not really thought of the giant all the time she was on the spaceship. It seemed curiously hard for her to grasp

that such a menace had come out of nothingness only that morning, and was now threatening the nature of things Isher.

She managed finally: "What about him? I've been busy."

"Thirty-four cities, Innelda. Only one person killed yet, and that an accident. But think of it. It's real; it's no joke. The continent's beginning to boil like a toppled ant hill. He destroyed small establishments only, leaving the big companies untouched. A regular tidal wave of rumors have started about that, and I don't think any amount of propaganda is of value, so long as that damned thing is at large."

He broke off: "Listen Innelda, what's this about you hiding an interstellar drive? Is there any truth in it?"

She hesitated; then: "Why do you ask?"

"Because," he said grimly, "if it's true, and if that's what's behind the giant, then you'd better start thinking seriously of handing the secret over with the best possible grace. You can't stand another day of the giant."

"My dear"—she was cold, determined—"we'll stand a hundred days, if necessary. If an interstellar drive should be developed, the House of Isher would under present circumstances be opposed to it!"

"Why?"

"Because"—her voice was a resonant force—"our population would shoot off in all directions. In two hundred years, there'd be thousands of upstart royal families and sovereign governments ruling hundreds of planets, declaring wars like kings and dictators of old. And of all the people they would hate most would be the ancient House of Isher, whose living presence would make their loud pretensions ridiculous. Life on Earth would become one long series of wars against other star systems."

She went on tautly: "It may seem silly to think of a situation as it would be two hundred years hence, but a family like ours that has ruled in unbroken line for more than forty-seven hundred years has learned to think in terms of centuries."

She finished: "On the day that an administration method is developed whereby controlled stellar emigration is possible, on that day we could regard with approval such an invention. Until then—"

She stopped because he was nodding, his lean, strong face thoughtful. "You're right, of course. That angle never occurred to me. No chaos like that can be permitted. But our own situation is becoming more serious every hour. Innelda, let me make a suggestion."

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"Yes."

"You're going to be shocked."

A tiny frown creased her forehead. "Go ahead."

"All right. Listen: The Weapon Shops' propaganda is benefiting from the giant's handiwork, and at the same time they keep denouncing the giant. Let's take them up on that."

"What do you mean?"

"Let me get in touch with them. We've got to identify the people behind that giant."

"You mean, *work* with them?" The thought was like a blow, whose repercussions billowed wavelike along her nerves. She found her voice in an explosive outburst: "After three thousand years, an empress of Isher begs the aid of the Weapon Makers. Never!"

"Innelda, the giant is at the present moment destroying the city of Lakeside."

"Oh!"

She was silent. For the first time, she felt stunned as well as dismayed. Glorious Lakeside! Second only to Imperial City in all her great realm.

She tried to picture the shining giant crashing through the wonder city of the lakes. And, slowly, she nodded agreement.

There was no longer any doubt. After one short day, the giant was become the most important factor in a shattering world except—

She hesitated; then: "Prince!"

"Yes!"

"Captain Hedrock left me an address. Will you try to get in touch with him, and ask him to come to the palace, tonight if possible?"

Her cousin looked at her thoughtfully, said finally, simply: "What's the address?"

She gave it, and then sat back, forcing herself to relax. It was relieving after a minute to realize that she had made so *many* great decisions.

## XI.

When Hedrock saw the twenty-foot rat coming at him with bared teeth, he gathered his strength with a desperate will. In his grim fashion, he waited till the last possible moment; and then—

The roar of his voice filled the room with its threatening echoes.

There was a massive squealing as the rat dodged aside into the far corner. It crouched there; and he could see that its violent movement had incremented its already speeded up life processes. Slowly, it began to keel over.

Its glazed eyes peered at Hedrock, as he staggered over to the rat inclosure, straight for the line of power switches. It made no effort to follow him; and, in a moment, he had pulled the lever that furnished the force for its size.

More slowly, he walked back into the large room. He had already noticed where the wall had been smashed, but he did not pause to examine the break.

It required half a minute to find the creature, now that it was no longer physically magnified. But he finally saw the six-inch glint of dirty white, where it had crawled partly under a broken chair.

It was still alive, an old, a very old-looking rat. It twisted weakly as he picked it up and carried it through the rat inclosure into the laboratory beyond.

The feeling that came to him then had very little to do with the miserable creature he was placing in his data-gathering machine. It was pity, but on a vast scale, not for any individual; the compassion embraced all life.

He felt, suddenly, old and alone in a world where people and things lived and died with a heartbreaking rapidity, ephemeral shadows that blinked in the strong light from the sun, and then faded, and were gone forevermore.

With an effort, he fought off that black mood, and, turning away from the data machine, went to examine his rat inclosure.

The four rat houses were doing well. Each had a new batch of young ones, and from the size of them he guessed that they had been born since the mechanical process had been interrupted by the rat that had broken out.

It took an hour to repair the break in the big metal pen, but the whole process resumed with automatic precision the moment he threw the switches back into position.

The process was simplicity itself. He had begun it a thousand years before by introducing a dozen rats—six males and six females—into each of four specially constructed houses.

Food was provided at intervals. Filth was removed by an ingenious pusher device that worked on a gear system. Nature had her own automatic methods; and every little while youngsters appeared and grew up, adding to the weight on the delicate balances that held up the floor.

As soon as the weight of rats on the poised floor reached a set point, a little door would open, and, sooner or later, a rat would go into the narrow corridor beyond. The door would close behind it; and no other door in any of the four houses would open until it was disposed of.

At the far end of the corridor was bait, inside which was a tiny Weapon Shop magnifier. When swallowed, the magnifier warmed from the rat's body heat, and set off a relay, which opened the door into an inclosure forty feet long, wide and high.

It also set the little corridor floor moving. Like it or not, the rat was precipitated immediately into the open. That door shut too, blocking the way back.

More food in the center of the room activated the power that set off the magnifier. With a bang, the rat plummeted into size, becoming a twenty-foot monster, whose life functions speeded up in almost direct proportion to the difference in size.

In that accelerated life-world, death came swiftly; and, as the corpse cooled below a certain temperature, the magnifying power was shut off, the floor tilted, the small white body slid onto a conveyor belt, which transported it to the data-gathering machine, from whence it was precipitated into a ray bath and disintegrated.

The process then repeated. And repeated and repeated and repeated. It had been going on for a millennium; and its purpose was as simple as it was tremendous.

Somwhere along the line, the enlarging rays of the vibrator would do to a rat purposely what they had done accidentally to Hedrock fifty-five centuries previously. A rat would become immortal, and provide him with a priceless subject for experiment.

Some day, if he succeeded in his search, all men would be immortal.

The data card of the rat that had so nearly killed him turned up in the "special" rack. There were three other cards with it, but the special quality about them was the continued functioning of some organ after death.

Long ago, he had explored similar freak happenings to exhaustion.

The fourth card excited Hedrock. Ninety-five years, he thought tensely; it had lived the equivalent of ninety-five years. No wonder it had had time to break out. It must have lived several hours as a giant.

He calmed himself because—because he couldn't go into the matter now. The rat would have been precipitated, not into the dis-

solver, but into the preserver with the other specials, and would be waiting for his examination at some future date.

Right now, there were things to do, vitally important things affecting the existing human race; and he, who worked so hard for the future, had never yet let the might-be interfere at decisive moments with the tremendous *now*.

Besides, he had allowed himself to run wild before on "specials."

*Things to do*, he thought more urgently, and only one afternoon to prepare for the greatest, most sustained campaign in his entire, tremendous career.

It seemed abruptly too short a time because —damn it all—the preliminary wasn't going to be any walk-over either.

He had delayed too long; in spite of plans laid as long ago as seven hundred years, the crisis had smashed at him in a few short hours; and now he *had to* cram a year's work into half a day.

Imagine facing men like Nensen, Deely Triner on a day like this, when he couldn't possibly concentrate his whole attention on the probelm they represented! Nevertheless—

Smiling grimly, he walked back to his Transport room, and began a detailed study of a very large 'stat which occupied one whole corner. The 'stat was lined with row on row of glow points, slightly more than fifteen hundred.

It took quite a while to punch out the score of individual numbers that he wanted, and only seventeen turned a rich green. The other three flashed red.

The three men involved were probably out. He'd get them later.

Hedrock straightened from his job of selection, faced the 'stat plate as it started to glow. "Take a good look at me," he said grimly. "You will probably be seeing me today."

He paused coolly, mentally scrutinizing his next words. It would be silly to let on that he was talking to more than one. Undoubtedly, some of those shrewd men probably knew that other firms were in the same position as their own, but confirming their suspicion would be gratuitous folly.

Satisfied, Hedrock went on: "Your firm will remain open until tomorrow morning. Provide sleeping quarters, and games, and food for the staffs. Continue with normal business until the usual hour, or until further notice.

"Employees must be paid a twenty percent bonus for this week.

"For your private information, a great emergency has arisen, but if you do not hear further by seven a. m. tomorrow, consider the matter closed. Meanwhile, read Article 7 of your incorporation papers. That is all."

He clicked off the 'stat, grimaced at the lateness of the hour, and felt a vast impatience at the thought that at least thirty minutes must elapse between his verbal and his first physical call.

He shrugged finally. There was no other way. It was simply impossible that he appear in person a minute after his 'stat message. The message would have caused a big enough sensation as it was, without adding the complication of instantaneous arrival.

Besides, he had his "business" suit to get into; and the magnifier to swallow.

He stood finally with narrowed eyes, considering the potentialities of the interviews that he had to make. Some of the executives out there would be as tough to handle as Fursching steel. They'd been big bosses too long; his policy of letting a family operate for generations, merely paying into a central fund, but otherwise without control, had progressively weakened his authority.

It couldn't be helped. Control of so many was a practical impossibility. The only thing was—

Hedrock smiled grimly. Certain of the men, he had been intending to do something about for a long time. The time had come.

The half-hour up, Hedrock plugged in a transmitter, examined the gleaming corridor that showed beyond—and stepped through. The door he came to finally said:

STAR REALTY CO.
TRILLION CREDITS IN PROPERTIES
OFFICE OF THE PRESIDENT
J. T. TRINER
TRESPASSERS FORBIDDEN

With his ring, Hedrock actuated the secret mechanism of the door. He walked in, straight past the pretty girl at the great reception desk, who tried to stop him. The rays of his ring automatically unlocked the second door.

He was inside a large and imposing office. A big, pale-faced, pale-eyed man rose from behind a curving monster of a desk, and stared at him.

Hedrock paid him no attention. One of

the other rings that he had put on his finger was tingling violently. He turned his hand slowly; when the tingling stopped, the ring stone was pointing directly at the wall above the desk.

It was a good job of camouflage, Hedrock decided admiringly. The wall design was unbroken, the atomic cannon behind it perfectly hidden. Without his finder ring, he would never have spotted it.

Abruptly, he felt grimmer. He allowed himself the icy and swift thought that his discovery only confirmed his opinion of the man. An atomic cannon hidden in his office—what damnable stuff!

His private case history of Triner showed that the fellow wasn't merely self-centered and ruthless—those were common traits in an age of gigantic administration trusts. Nor was he simply amoral; hundreds of thousands of valuable and kindly Isher citizens had committed as many murders as Triner, but the difference in motive was like the difference between right and wrong.

Triner was a prurient wretch, a lecherous skunk, a very hound of evil, who should have been de-frosted years ago. He—

The man was coming forward, holding out his hand, a hearty smile on his wan face, a hearty tone to his voice, as he said:

"I don't know whether to believe in you or not, but at least I'm willing to listen."

Hedrock strode coolly toward the outstretched hand, as if to shake it. At the last instant, he simply stepped past the man; and in a moment had seated himself in the big chair behind the curving desk.

He faced the startled executive, thinking savagely: So Triner was willing to talk, was he? That was just dandy. But first he'd get some psychological bludgeoning, and a lesson in straightforward ruthlessness with emphatic punctuation of the fact that there were tougher men in the world than J. T. Triner.

Keep pushing him; keep him off balance. Hedrock said curtly:

"Before you sit down *in that chair*, Mr. Triner, before we talk, I want you to start your staff on the job you're going to do for me—are you listening?"

There was no doubt about it. Triner was not only listening; he was shocked and angry and bewildered. Like so many strong men subjected for the first time to the full force of a personality aura that was almost an energy in itself, he seemed unable to adjust his mental and physical functions to the staggering reality.

Not that he looked cowed; Hedrock knew

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better than to expect fear. Triner's expression simply grew cautious, with a mixture of curiosity thrown in. He said:

"What is it you want done?"

That was too important for ruthlessness of manner. Hedrock drew a folded paper from his pocket. "There," he said earnestly, "are the names of fifty cities. I want all my business properties in those cities listed according to avenues and streets. Never mind who's in them. Just get the street numbers, two, four, six, eight and so on. And only in cases where there are many in a row, like a whole block, at least a dozen altogether. Do you follow that?"

"Yes, but—" Triner looked dazed; and Hedrock cut him off:

"Give the order." Hedrock paused, then he leaned forward, his eyes narrowed to slits. "I—hope—Triner—that you have been living up to Article 7 of your constitution."

"But, man, that article was promulgated nearly a thousand years ago. You can't mean—"

"Listen," said Hedrock flatly, "can you provide that list, or can't you?"

Triner was sweating visibly. "I guess so," he said finally. "I really don't know. I'll see."

He stiffened abruptly, added through clenched teeth: "Damn you, you can't come in here and—"

Hedrock realized when he had pushed a man far enough. "Give the order," he said mildly, "then we'll talk."

Triner hesitated. He was a badly shaken man, and, after a moment, he must have realized that he could always countermand any instructions. Meanwhile—

"I'll have to use the desk 'stat."

Hedrock nodded, and watched and listened while the order was transmitted to a startled underling chief. The man at the other end of the 'stat protested, but giving orders was more in Triner's line than receiving them.

He barked like a sea lion; and seemed to recover more of his aplomb with every word. When he finally cut off the 'stat, he was completely himself. He drew up his chair alongside the desk. He smirked at Hedrock.

"What's the dope?" he asked in a confidential tone. "What's it all about?"

The man's very seeming acquiescence gave him away. Hedrock sat grimmer, colder. So the controls of the gun were *in* the desk, somewhere beside where Triner had drawn his chair.

It was time to get down to business with this creature.

Hedrock studied the physical situation thoughtfully. He was sitting at the desk, his back to the cannon, and with Triner to his left. The door leading to the outer office was about fifty feet away, and beyond it was the reception girl.

The wall and door would protect her. Anybody else who came in would have to be kept well to the left, preferably behind and beside Triner.

Hedrock nodded with satisfaction. His gaze had never left Triner; and now he said:

"I'm going to tell you everything, Triner"—that was an appetizer for the man's undoubted curiosity, and should restrain his impatience; Hedrock went on—"but first I want you to do one more thing. You have an executive accountant in the head offices here, named Royan. Ask him to come up. After I've spoken to him, you'll have a better idea as to whether he'll be in the firm after today."

Triner looked puzzled, hesitated, and then spoke briefly into the 'stat. A very clear, resonant voice promised to come up immediately.

Triner clicked off, and leaned back in his chair. "So you're the man behind that mysterious wall 'stat," he temporized finally.

He waved a hand at the design of the wall beside him, then said suddenly, his voice intense: "Is the empress behind us? Is it the House of Isher that owns this business?"

"No!" said Hedrock.

Triner looked disappointed, but said: "I'm going to believe that, and do you know why? The House of Isher needs money too badly and too continuously to let a treasure like this company vegetate the way it's been doing. All that stuff about dividing the profits with the tenants periodically, whatever else it is, it isn't Isher."

"No, it isn't Isher," said Hedrock; and watched the baffled look that came into Triner's face. Like so many men before him, Triner didn't quite dare defy the secret owner so long as there was a possibility that the owner was the Imperial family. And Hedrock had found that denial only increased the doubts of the ambitious. He—

There was a knock at the door, and a young man of about thirty-five came in. He was a big chap with a brisk manner; his eyes widened a little as he took in the seating arrangement of the men in the private office. Hedrock said:

"You're Royan?"

"Yes." The young man glanced at Triner questioningly, but Triner did not look up.

Hedrock motioned to the decoration that was the wall telestat. "You have been previously informed as to the meaning behind this 'stat?"

"I've read the incorporation articles," Royan began; and then he stopped. A wild understanding poured into his eyes. "You're not that—"

"Let us," said Hedrock, "have no histrionics. I want to ask you a question, Royan?"

"Yes?"

"How much money"—Hedrock articulated his words—"did Triner take out of the firm last year?"

There was a little hiss of indrawn breath from Triner, then silence. The two men, Royan and Triner, looked at each other steadily for a long moment, an unmistakable and violent clash of minds. Finally, Royan laughed

softly, an almost boyish laugh, and said:

"Five billion credits, sir."

"That's a little high, isn't it," Hedrock asked steadily, "for a salary?"

Royan nodded. "I don't think Mr. Triner regarded himself as being on salary, but rather as an owner."

Hedrock saw that Triner was staring fixedly down at the desk, and his right hand was moving casually toward a tiny ornamental statue.

The crisis had come.

Hedrock said: "Come over here, Royan." He motioned with his left hand, waited until the young man had taken up a position to the left of Triner, and then manipulated the ring control of his own magnifier.

The magnification involved was very small, not more than an inch all around. He could have gained the same physical effect by sitting up and swelling out his chest. What was important about it was that it changed the basic structure of his "business" suit and of his own body. Both became virtually as impregnable as a Weapon Shop itself.

Six months before, on entering the palace, he had racked his brain for a method whereby he might safely take the suit in with him. But the danger of having it stolen by alert palace spies while he was not wearing it had made that utterly impossible.

From its structure, any competent physicist could have analyzed at a glance the basic vibrational secret of the Weapon Shops.

The suit not only carried the considerable power plant necessary to such an intensive form of magnification, but its innate construction served to confine the entire process to itself and to what it inclosed, a very necessary precaution.

Hedrock felt the greater rigidity of his body; and his throat was stiffer, his voice slower, as he said:

"I would say the salary was much too high. See that it is cut down to five million."

There was a wordless sound from Triner, but Hedrock went on speaking to Royan in that slow, steely voice:

"Furthermore, in spite of its co-operative structure, this firm has acquired an unenviable reputation for remorselessness, and the policy of its president of having pretty women picked up in the street and taken to his various secret apartments is—"

He saw the final movement as Triner convulsively grasped the statuette. Hedrock stood up—as Royan yelled a warning.

The fire from the cannon disintegrated the chair on which Hedrock had sat, spumed off the metal desk, wrenched the ceiling with flame. It was immensely violent, at least ninety thousand cycles of energy, but it was not so strong that Hedrock did not notice the flash of Royan's gun.

After a moment, then the sequence of events was clear. Triner had manipulated and fired the cannon at Hedrock, then whirled, drawing his Imperial gun with the intention of killing Royan. Only Royan, using a Weapon Shop defensive model, had fired first.

Where Triner had been was a shimmgness that twinkled and—faded.

In the office, between Hedrock and Royan, silence settled. Finally—

"I don't see," said Royan "how you escaped."

The man looked excited. His voice trembled. He was white as a sheet and he obviously needed patient handling for a few minutes. Only, there wasn't time; there wasn't time. Already, it seemed to Hedrock, he had spent far too many precious minutes in one office. Hedrock switched off his magnification, said hurriedly:

"You're the new president of the company, Royan. Your salary is five million a year. What kind of mind-training course are you giving your son?"

The man was recovering more rapidly than Hedrock had expected. "The usual," he said.

"Change it. The Weapon Shops have recently published the details of a new course, which is not very popular as yet. It includes the strengthening of moral functions. But now . . . when will the lists be ready that Triner ordered for me? Or do you know about them?"

The speed of the conversation seemed to be dazing Royan again, but he carried the load. "Not before six. I—"

Hedrock cut him off: "You are going to get some awful shocks tomorrow, Royan, but bear up. Don't lose your head. We have incurred the wrath of a powerful secret organization. We are to be given a lesson. There will be great destruction of our property, but do not under any circumstances let on to anyone that it *is* our property, nor begin reconstruction for a month, or until further notice."

He finished grimly: "We must take our losses without outcry. Fortunately, tomorrow is Rest Day; the people will be away from their

shops. But remember, have—those—lists—ready—at—six!"

He left the man abruptly, smiling darkly. The secret organization stuff was as good a story as any, and when the giant started moving, all its weaknesses would be dwarfed by the horrendous reality. But first, now, some other calls, a few of the easier ones, then eat, then the arrogant Nensen, and then—

In his retreat an hour later, he prepared a meal, and frowning, reviewed his main other weakness.

Tomorrow was Rest Day. The only possible day on which he could act without killing thousands.

And he didn't know—he didn't know the issues at stake. There was, of course, what Gonish had said about it being interstellar travel. There was the tremendous logic that the empress, mature as she was today, wouldn't act as she did unless it was something of immense importance.

But he didn't know.

He must prepare, lay the entire groundwork—and wait for information. If it didn't come—

The thought was a bleak question mark at the back of his mind, as he visited the rest of the twenty. Nensen, he killed by the simple method of reflecting the energy of the man's own gun back at him. The once indomitable Deely turned out harmless, a reformed monster of an old man, who resigned swiftly when he saw that Hedrock was not interested in so delayed a conversion.

The other men were obstacles whose curiosity and mental inertia had to be overcome. It was a quarter to seven the next morning when Hedrock took a sleeping pill and lay down for half an hour to let it work on his weary body—and still there was no new information anywhere.

He adjusted his magnifier finally to full power, and went out because a few hours of busting buildings that he owned would force whatever situation existed into the open and because it was—Rest Day.

By noon there was no turning back. The Weapon Shop confirmation that it was interstellar travel at stake steeled his nerves and his heart for the colossal destruction still ahead.

At five o'clock came the automatically relayed and recorded message from the empress asking him to come to the palace. That was


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vastly startling. Hedrock thought sharply:

Was it perhaps a trap, the result of the offer made by the Weapon Makers to help the government? Or was it—

Almost he dared not believe that the glorious Innelda had become so panicky about the future of the House of Isher. But the chance couldn't be missed. All previous plans must accordingly be shoved twenty-four hours ahead and— Trembling, Hedrock tuned into the secret wave length of the Weapon Makers council, or rather the wave length they thought secret; and, disguising his voice, said:

"Members of the Weapon Makers council, I am sure that you have already realized the great advantage to your cause of what the giants are doing."

It seemed to Hedrock that he must keep stressing that there were more than one involved; the Weapon Shops knew only too well that a normal human being aged five years every thirty minutes when enlarged. Men of course—*no*-men—would grasp easily that they were dealing with an immortal man. Still, not even a hint must be given them. He went on with intense urgency:

"The giants need immediate assistance. The Weapon Makers must now take over, must send out volunteers to play the role of giant for fifteen minutes or half an hour per person. They do not have to destroy, but their appearance will give an effect of continuity, and will lend psychological support to Weapon Shop propaganda.

"It is essential that the first giant appear sometime early this evening. For your sake, for the sake of the progressive forces of man, do not fail."

He was still in his hide-out fifteen minutes later when the first of the giants appeared. So quick was the response and—

It was too quick. It showed private plans. It showed that the greatest force in the solar system was reacting like a finely poised steel spring—and he'd better get to the palace fast. But first—

The time had come to bring into use one of his secret inventions. To begin with, a little trip through the one that he had here in his hide-out. Later, when the crisis came, he could make an attempt to utilize a replica that, long ago, he had secreted in the tombs of the palace.

The next twelve hours would be—decisive.

TO BE CONCLUDED.

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